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ABSTRACT

As a part of a longitudinal study of learning in open plan and conventional design classrooms, the present study focuses on school design and its influence on selected behavior of pupils and teachers. The behaviors of pupils and their teachers in eleven learning areas of open plan and seven of conventional design were observed. Among the 18 classrooms, differences were found in the usage patterns of the major learning areas and in the nature and frequency of interaction between pupils and teachers. Compared with their peers in the conventional classrooms, pupils in the open plan classrooms were less often observed working by themselves but more often observed in small-group work and in communication with their peers and teachers. However, school design did not appear to be a critical factor that could explain most of these differences. It is proposed that school design is a less powerful determinant of teacher behavior than school organization and teacher tradition are. (Author/ML F)

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THE AUSTRALIAN OPEN AREA SCHOOLS PROJECT

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AN OBSERVATION STUDY OF SELECTED PUPIL AND TEACHER BEHAVIOUR IN OPEN PLAN AND CONVENTIONAL DESIGN CLASSROOMS

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TECHNICAL REPORT No. 4

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Fitzpatrick, G.S. and Zani, T.L. *Australian Open Area Schools Project, Technical Report No. 2: Teachers' Comments on Open Area and Conventional School Design.* Perth: Education Department of Western Australia, 1974.

Beck, Tinsley M. *Australian Open Area Schools Project, Technical Report No. 3: Openness as a Variable in Educational Research.* Perth: Education Department of Western Australia, 1975.

AUSTRALIAN OPEN AREA SCHOOLS PROJECT

Technical Report No. 4

AN OBSERVATION STUDY OF SELECTED PUPIL AND TEACHER BEHAVIOUR IN OPEN PLAN AND CONVENTIONAL DESIGN CLASSROOMS

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FOREWORD

The end of the sixties witnessed throughout Australia a remarkable transformation in the design of school buildings. The rows of self-contained classrooms were being replaced by open teaching spaces often free of impediments such as fixed walls and furniture. At the same time the informal approach to teaching, enunciated so well in the Plowden Report (Central Advisory Council for Education, 1967), has had an increasing expression in Australian schools. The Australian Open Area Schools Project is an attempt to evaluate the development of both the architectural and teaching approach phenomena.

The major stage of the Project consists of a longitudinal study of learning in open plan and conventional design classrooms. In March 1974 some 2,200 Year 5 children in 123 schools of open plan and conventional design were measured in a number of cognitive and non-cognitive areas. The children were remeasured in November of 1974. Most of the data relating to pupil outcomes were gathered by questionnaire. The analysis of this data is presently nearing completion.

In addition, a number of smaller associated studies were initiated. The present observation study has focussed on school design and its influence on selected behaviour of pupils and teachers.

The authors wish to convey their appreciation and gratitude to a number of people who were involved in this study. Foremost amongst these persons were the principals of the participating schools and the classroom teachers who permitted themselves and several children in their classes to be observed. The schools involved were: Amaroo Primary, Blackmore Primary, Bluff Point Primary, Churchlands Primary (on two occasions), Connell Avenue Primary, Glendale Primary, Highgate Primary, Kewdale Junior Primary, Kingsley Primary, Loreto Convent, Mount Pleasant Primary, North Inglewood Primary, Riverton Primary, South Bunbury Primary, Toodyay District High, Warriapendi Primary and Willetton Primary.

Particular thanks are also due to the following observers who on the two occasions of data collection were final year student-teachers appointed to their host schools for a one term practicum: From Claremont Teachers' College during the final term of 1973 - Mr John Barrow, Mr Mark Brown,

Mr William Dawson, Ms Teresa Grzeczny, Ms Gail Haywood, Mr Terry Hinchliffe, Ms Anne Perry, Mr Rodney Steere and Mr Murray Wells. From Churchlands Teachers' College during the first term of 1974 - Ms Joy Cosgrove, Ms Elizabeth Frieberg, Ms Patricia Hancey, Ms Genevieve Holland, Ms Christine Holliday, Ms Kerry Larson, Ms Julie Simpson, Ms Kerry Waddell and Ms Dorothy Zaccaria.

Finally, to those who in other ways assisted the presentation of this report, special thanks are extended.

A.N. STEWART
PROJECT DIRECTOR

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WHAT IS OPEN PLANNING?

The word 'open' has many connotations. In the education literature it has come specially to refer to a particular type of educational programme as well as to a style of school architecture.

Probably the term 'open planning' is derived from the concept of a school which has been physically opened up by the removal of internal walls and partitions. As such, open planning represents a departure from the traditional school which deliberately tried to isolate the teacher and her pupils. Inherent in the concept of open planning is the notion that children will want to form groups of various sizes and be simultaneously engaged in a variety of different tasks, rather than remain seated in class-size groups attending to a common task for most of the day.

Concurrent with the extension of open planning in Australian primary school design has been a revival of interest in progressive educational methods. Much of the literature which is promoting the informal, progressive teaching approach has been subsumed under the heading of 'open education'.

A clear distinction should be made between open plan schools and open education. In the former, openness refers to a characteristic of school design while in the latter openness is usually viewed as a quality of instruction. Discussion of open planning often assumes that open plan schools have been deliberately designed to implement open education. This, however, is not necessarily the case: in Australia, the number of open plan schools is hardly a satisfactory index of a school system's commitment to open education. In fact, it would be difficult to pick at random an open plan primary school and accurately predict the nature of the educational programme that it implements. However, as this report later details there is evidence to suggest that open planning is an architectural device deliberately developed to encourage flexibility of approach and to avoid imposing upon teachers any particular instructional or organisational style.

This report examines the influence of open plan school design upon the behaviour of teachers and pupils.

What then are the essential characteristics of open planning? There is no clear agreement among architects or educationists as to what constitutes an open plan school building. Definitions are bound to reflect local knowledge and interpretation.

One authoritative definition of open planning from Britain can be found in a Building Bulletin of the Department of Education and Science (1972). It describes five fundamental design features:

1. quiet, partly furnished places for groups of children to work;
2. soundproofed, self-contained rooms to accommodate up to a dozen children;
3. general work areas, relatively uncommitted in which furniture can be re-arranged in various ways for unpredictable activities and groupings;
4. bays for particular kinds of work which need special equipment and services, and
5. outdoor covered work areas.

Using these guidelines it is possible to design a large number of configurations that would visually and structurally differ yet would qualify as open plan schools. This variability of interpretation occurs in the Australian context.

To begin with, there is little agreement among school systems regarding terminology. For example, in South Australia school buildings which incorporated the listed features outlined above would be classed as 'open space' (a distinctly North American term); in Western Australia similar schools would be generally classified as 'open area' (also a North American term), and in Queensland the 'multiple area school' is the preferred nomenclature.

More significantly, there are differences in design. For example, a number of South Australian open plan primary schools are notable for large open spaces, the equivalent size of eight conventional classrooms, without provision for complete and permanent partitioning between teaching areas. Other open plan building units contain six, four or two teaching areas.

The Queensland school system has favoured smaller teaching areas of size comparable to two conventional classrooms. Generally, this has been the pattern in Victoria and New South Wales, particularly in the instances when conventionally designed schools have been remodelled by the removal of walls between adjoining pairs of classrooms. The design of primary schools in recent years in Tasmania, the Australian Capital Territory and the Northern Territory, has been characterised by a variety of spatial configurations of an open plan type.

In the Western Australian open plan schools, from which the majority of data for the present study were gathered, learning spaces are located in clusters of six, though their arrangement is such that they are more likely to function as six individual units or as three pairs of adjoining teaching areas. Data were also collected from one non-Government primary school built along an open plan model.

In some school designs partitioning is provided which can allow the teacher to visually and acoustically isolate herself from her colleagues. At the time data were collected nearly one in four Government primary schools in Western Australia was predominantly open plan in character. All Government primary schools constructed since 1968 have been of open plan design and plans of the four basic models are included as Appendix 1. This level of commitment to open planning has been shared in recent years by most primary school systems throughout Australia.

The open plan school does not reflect the primary school building familiar to most Australians. The traditional stereotype consists of an administrative centre (principal's office and staffroom) and a number of self-contained classrooms of equal size. The latest architectural differences have caused many observers to attribute various functions and educational effects to the influence of open plan school design. Some commentators even go so far as to refer to 'open area education' as though there was a carefully defined pedagogy implicit in the design. The assumption that open plan school design exerts a predictable and consistent effect on the behaviour of teachers and pupils requires examination.

WHY SHOULD THE BEHAVIOUR OF TEACHERS AND PUPILS DIFFER IN OPEN PLAN SCHOOLS?

Because teachers think they are expected to adopt different teaching procedures?

The differences in physical appearance between typical open plan and conventional schools are quite striking. Structurally, the buildings are fundamentally different. The building materials and the furnishings exaggerate the impression of difference. Hence, it seems a quite reasonable assumption for any teacher to accept that this new structure has not been provided to perpetuate the old order of instruction. Precisely what particular changes were expected of teachers, however, are not always clear. Fitzpatrick and Angus (1974) have described some of the beliefs of teachers in open plan schools regarding expected changes in their teaching behaviour. Some were vague about what was required of them. One teacher commented:

> Yes, I feel that something different is definitely expected, but nobody has ever told me exactly what. The Head has made me feel he is sitting back waiting for something great to happen, and yet as I was new to the situation I didn't have any idea of how to go about it. (p.30)

In that same study the most frequently expected change mentioned by teachers concerned the practices associated with team or co-operative teaching. Such a response was:

> In this school I think I am required to be a member of a team much more than in a conventional school. I have less opportunity of being an individual, and being a member of a team I've got to very seriously consider the wishes of the other teachers teaching adjacent to me. (p.30)

Most teachers reported expectations that described their relationships with their colleagues rather than with children.

The absence of unanimity regarding expected changes to teaching behaviour is not entirely surprising. Government school systems have been cautious of endorsing any particular approach as indicated by the comments of a senior primary school administrator. Palmer (1973), the Director of Primary Education, wrote of new school design in Western Australia:

> The design should enable a choice of both organisation and method and should not compel either a particular educational approach or organisational structure. (p.4)

Thus within the school system from which all but one of the participating schools were selected there has been no concerted campaign by Departmental administrators to pursue one particular teaching philosophy or style.

Because open plan schools are built by administrators and staffed by teachers who favour different teaching strategies?

Even though school systems in Australia have generally refrained from publicly associating open plan schools with particular organisational patterns and opted instead for 'flexibility', open plan schools have come to represent environments that facilitate particular teaching practices. This is because administrators, in adopting school design principles that evolved in the United Kingdom and North America, have inevitably absorbed at least part of the associated educational rationale. An important element in this rationale is the notion of co-operative teaching, though open plan schools are seen by teachers to facilitate a wide range of teaching practices and organisational strategies.

In a Canadian investigation, Allen (1972) has described teacher-reported advantages of open plan schools. He distinguished between those which he believed may be attributed to the changed physical environment, such as flexibility of grouping, staff co-operation and availability of resources, and others which he associated with progressive organisational trends, or 'open plan philosophy' such as continuous progress and individualisation.

Whether or not an open plan philosophy actually exists, in the sense that a coherent and recognisable body of teaching principles has emerged from a consideration of the function of the open plan design features, is a moot point. However, Rathbone (1972) has pointed out that it makes sense to expect educational and organisational functions to be influenced by educational environments which have spaces functionally differentiated as in the open plan school. For example, the supposed flexibility of an open plan school should facilitate *ad hoc* arrangements of space that will enable new and unanticipated functions to be relatively easily accomplished. As well, the open plan environment seems to imply greater movement of individual children from area to area and activity to activity, and less direct supervision of children by teachers.

Nevertheless, if teachers who anticipate these advantages and influences gravitate to open plan schools then presumably their disposition, in conjunction with any facilitating effect of the design, will influence their behaviour. In the context of the present study, this explanation of any differences in behaviour is less compelling in the light of staffing patterns in the Western Australian school system. Staffing is a highly centralised process. The promotional system and the movement of teachers between country and metropolitan schools have encouraged a highly mobile workforce. Style of school design is not a factor associated with the promotional structure. It is usually very much a secondary consideration in the appointment of a teacher to a school. The net result has been to reduce the likelihood of an open plan school being staffed by a group of teachers who collectively perceive the school to be a vehicle for facilitating a particular instructional style.

Because teachers are involuntarily influenced by the design?

A third possibility exists. Irrespective of whether teachers perceive themselves to be expected to behave differently or are disposed to behave differently, the building of itself may directly influence the behaviour patterns of pupils and teachers. At the most microscopic or the most trivial level this hypothesis is almost certainly true. Differences in acoustics or the special arrangement of desks, blackboard, and other resources may cause the teacher to make subtle changes to her behaviour. She may have to concentrate harder to hear conversations or walk further to collect resources or react to distractions or advice from colleagues in adjoining teaching spaces. The list could be extended. These apparent trivia are of consequence if effects aggregate and influence the adoption of a particular teaching strategy.

There are other ways in which the physical environment can subtly influence behaviour. The arrangement of desks provides an example. Sommer (1969) has documented the importance of seating arrangements in generating pupil interaction. Corner and opposite seating positions were preferred for discussion purposes. These findings are at odds with the traditional desk settings in classrooms which were designed to isolate pupils and discourage discussion between peers. Some arrangements of desks in a classroom can encourage an informal interaction among pupils during instruction. These arrangements may reflect a teacher's attitude to pupil interaction.

Demonstrating environmental effects is a difficult interprise. Drew (1971) has pointed out that while there has been a longstanding awareness that the physical environment could be manipulated to achieve obvious physical or behavioural results, the research has been fragmentary and the mechanisms of change are not well understood. An examination of some of these environmental influences was a focal point of the present study.

In exploring the question of design effects upon behaviour patterns four particular areas of interest were considered. These related to:

1. the mobility of teachers and pupils;
2. the nature of pupil groupings with respect to membership and size;
3. the content of individual pupil and small group contact with teachers, and
4. associations between aptitudes of pupils and the extent of teacher contact.

A variety of research techniques were considered ranging from the anecdotal, case-study approach through to the more complex systems described in Simon and Boyer's (1967) collection of observational instruments, most of which are addressed to exploring such concepts as teacher effectiveness and classroom climate and rely heavily upon the categorisation of verbal cues.

Other studies of verbal interaction patterns in open plan and conventional schools have been conducted, though the evidence is inconclusive. Ellison, Gilbert and Ratsoy (1969) found that, contrary to their expectations, more time was spent in large group instruction and in teacher initiated talk in open plan classrooms than in conventional classrooms. However, no real differences were found with respect to presenting information and instructional supervision.

Ready-made classroom observation schedules were considered, though not adopted, for this study in spite of cautions such as those offered by Nuthall (1968) and Dunkin and Biddle (1974) regarding the development of new instruments. Most observation schemes currently available have been developed from particular conceptual frameworks and have been tailored to fit the requirements of a self-contained classroom situation in which a fixed number of pupils participate in a relatively formal teaching programme. In informal learning situations the Flanders category system is deficient.

Walker and Adelman (1975) point out that teachers and children often do not talk in ways which can be efficiently categorized according to an *a priori* coding system. It is possible that Walker and Adelman's observation may explain the somewhat anomalous results found by Ellison and his colleagues.

Some techniques which cope with the practicability of observing teacher and pupil behaviour in non-traditional classrooms were considered for use in the present study. Jackson and Lahaderne (1967) examined the interactions between teachers and pupils, collecting data in four sixth-grade classrooms. They categorised interactions according to whether the communication was primarily *instructional*, *managerial* or *prohibitory*. Resnick (1972) has examined the procedures adopted by teachers in *maintaining*, *intervening* and *directing* activities in an informal infant school where, in the basic skill areas of mathematics and reading, there were no regularly assigned or scheduled lessons. The basic data were teacher utterances. Garner and Bing (1973) looked at the distribution of teacher-pupil contacts in five primary school classes. The classification system was based on the Jackson and Lahaderne schedule. The main data were teacher and pupil utterances. A similar study was conducted by Boydell (1974) who investigated nineteen types of teacher conversation and three methods of addressing children (as a class, in a small group and privately on their own).

In general the studies cited above have been characterised by an emphasis on description and by a low level of generalisability due, in part, to the small number of classroom situations investigated.

The dimensions and categories of behaviour utilised in the present study were derived from a consideration of the expected influence of school design on teacher and pupil behaviour. The basic data collected were the *locations* of the teacher and of a selected pupil at 30 second intervals, and a classification of the *overt behaviour* of the pupil at the end of each 30 second interval. The behaviour was classified according to whether it:

1. was fundamentally task or non-task oriented;
2. involved the child by itself, or the child and its peers, or the child and teacher;
3. was essentially an activity, a movement or a communication;

4. was typical of the behaviour of the majority of a class-size group of students, and

5. involved the child by itself, or the child within a group of between two and five persons, between six and ten persons, or within a larger group.

A detailed description of the categories is contained in Appendix 2.

The data were collected in two stages. On the first occasion (Stage I) children and teachers were observed at nine different schools in five open plan situations and four conventional classroom situations. On the second occasion (Stage II) observations were made at nine schools in six open plan and three conventional classrooms. Assistance in observing was given by final year student teachers from Claremont Teachers' College during Stage I and Churchlands Teachers' College during Stage II.

An individual child was the focus of each observation. Four children were chosen from each classroom and observed in turn for approximately a quarter of the total observation period within a classroom. Two children were deliberately chosen on the basis of their being above average achievers according to teacher judgments and records. The other two children selected were below average achievers. Only the Stage II data contains information relevant to category (4), which indicates whether the behaviour of the child was typical of the group, and category (5), the size of the interacting group.

Observation segments were of twenty minutes duration. Behaviour and patterns of movement were sampled for each of the four pupils and the teacher in various subject areas.

Sixteen 20 minute segments comprised the total observation period in each classroom or learning area. Observations were recorded every 30 seconds on specially prepared sheets which displayed a plan of the environmental features of the classroom and a grid in which the behaviour of the pupil was classified. A sample recording sheet is shown in Appendix 3.

The data were collected from children working from Year 1 level through to Year 6 level, though the majority (61.8 per cent) were in the Year 5 level. In Western Australia children in Year 5 level are nine to ten years of age. Children were observed during a variety of lessons during Stage I of the study though most lessons related to the mathematics, speaking and writing skills areas, and social studies. Children participating in Stage II

were observed during English skills, art, mathematics, social studies and reading lessons. In nearly all cases specific lessons were occurring. Free activity periods did not characterise the instruction in the schools included in the sample in either Stage of the study. The integrated studies or 'free day' approach are not typical of instructional methods in Western Australian primary school classrooms.

Each observer participated in training sessions over a period of eight weeks. Practice sessions using the observation schedule were conducted in open plan classrooms where the definitions for each behavioural category were elaborated and various practical difficulties overcome. Reliability trials were conducted. The first trial involved eight of the nine observers from Stage I of the study. In separate classroom settings the overall consensus of agreement over a measured 20 minute segment of time ranged from 62.5 per cent to 100 per cent of the observations. The average was 90 per cent agreement. The second trial with the Stage II observers indicated a percentage agreement between each of six observers of 63.3 per cent and between four observers of 80.6 per cent with an overall average of 71.9 per cent.

An important detail to note regarding the data collection was the relatively unobtrusive manner in which the data were collected. The observers were located in schools for a three month practicum. Formal observations did not take place until the observer was recognised by the pupils as a supernumerary person in their classroom. Before efficient observations began one of the writers of this report visited the school to review procedures with the observer and ensure that the study had the full support of the classroom teacher involved.

Idiosyncratic and Programmatic Differences in the Use of Space

Although there appeared significant consistencies among the patterns of usage in some classrooms, there were also surprising differences. That this variation exists should not be especially surprising. In the first instance, it has already been noted that the open plan environment is of flexible design intended to suit a variety of teaching approaches. Secondly, even where teachers are provided with standardised learning environments it would be hopeful in the extreme to imagine that the architectural provision will suit individual teachers equally. There is no such thing as the standardised teacher. Given the adaptability and previous experiences of teachers, the probability is fairly high that each will attempt, to some degree, to adjust the environment to suit her needs.

Patterns of pupil and teacher movement need not of themselves indicate quality of educational provision. For example, some teachers may prefer to anchor themselves at their desks or tables for large portions of time. This habit need not imply either inefficiency or tiredness. It may more appropriately express a preference for the child to take the initiative and come to the teacher when the *child* perceives the need rather than the teacher to patrol the desks and systematically interact with pupils as *she* perceives the need. Protracted desk sitting on the part of the teacher would be a more negative teacher trait if its effect was to isolate the teacher from her pupils.

Again, some teachers may thoroughly patrol the learning area during the day. While on the one hand this trait may indicate a healthy vigour and interest in every child it may also indicate excessive or unnecessary surveillance. This attention might be better directed towards particular children with difficulties rather than, perhaps, intercepting an activity that had occurred spontaneously among a group of children and which was proceeding responsibly and efficiently.

Obviously, not all building usage is idiosyncratic. Particular educational programmes ought to provide predictable and consistent patterns of usage. The use of the 'home base' or 'quiet area' provides a case in point. In some British infant schools, the home base assumes special significance in the overall scheduling of the school day. This space, to quote the Buildings Bulletin of the Department of Education and Science (1972), is a place where:

> ...each group of children can feel they belong. A comfortable, friendly space where they can meet together amongst things made by them and belonging to them. It will certainly be neither large enough, nor furnished for everyone to sit at tables and chairs, but will be used by smaller groups for quiet work throughout the day. This, essentially, is a 'private' space. (p.10)

In the home base area, at set periods of the day, all children meet to chat, tell stories, listen and plan. During these sessions the teacher and pupils may be immobile for twenty minutes or more. Hence usage patterns in this situation would predictably show a segment where, at some stage of the school day, the teacher and pupils were located in this space: perhaps the teacher with small groups, or children by themselves or in small groups, depending upon the nature of the activity.

Because the Western Australian open plan schools evolved from a British design, spaces comparable to the home base have been provided in the local schools. They are known locally as quite areas. Whether a teacher cares to use this space as a home base will depend upon her understanding of its purpose. Without this understanding this space may assume a variety of unintended uses. One such use is to adapt the quite area into an auxiliary storage area. Other teachers appear to exclude children from them for much of the school day. Figure 1* illustrates a pattern of pupil movement and

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* In this figure and in subsequent figures the locations of pupils and teachers for the entire observation period in each classroom are plotted. Symbols are used to mark the locations of pupils and teachers at the end of each 30 second observation period. A single observation is marked by one symbol alone. Shaded areas encircling a symbol indicate that a pupil or teacher was observed at approximately the same location for the number of observations specified alongside. Individual pupils are identified by separate symbols. The star and triangle represent the above average achieving pair while the square and circle represent the below average achieving pair. Teacher locations are indicated on separate diagrams and are represented in all cases by the circular symbol.

Appendix 4, from which these illustrative figures are taken, contains the patterns of pupil and teacher movement observed in all classrooms involved in the study.

Figure 2 shows the corresponding pattern of teacher movement in the same open plan classroom. The concentration of both pupil and teacher movement in the quiet area shows considerable use is made of this space, perhaps consistent with the home base concept. Figures 3 and 4 which together display corresponding pupil and teacher movement in a different classroom show a contrasting pattern of use. This evidence underlines the difficulties school designers have in providing ideal learning and teaching environments for a clientele of unknown users.

Non-Functional Space

A critical feature of the architectural brief (Education Department of Western Australia, 1975) for the Western Australian open plan school has been the specification that partitioning or operable walls should enable each teacher to enclose her learning area should the requirements of her teaching programme so demand. In other words the open plan school should be able to operate effectively as a traditional school, with the adjacent learning areas fully self-contained and enclosed. In order to implement this requirement the learning areas have been arranged in configurations that facilitate partitioning. In addition they have been designed according to a size and shape that closely approximates a conventional rectangular classroom. Hence, even when partitions are not drawn, the learning area boundaries are easily defined. These observations are important in explaining the uneven use of the learning spaces made by some teachers in open plan learning areas.

In some open plan classrooms it was observed that desks had gravitated towards the blackboard and away from the boundary demarcating adjoining teaching areas. Figure 5 illustrates this pattern. There may be several explanations of this phenomenon.

Firstly, acoustic and visual distractions are most pronounced around the perimeter. The adjacent teacher's programme affords a competing set of stimuli. As long as the class remains the basic organisational unit then these stimuli will be perceived as distractions for children other than the class group for which they were intended. The availability of mobile furniture facilitates a compact cluster of desks often facing the blackboard and teacher's table.

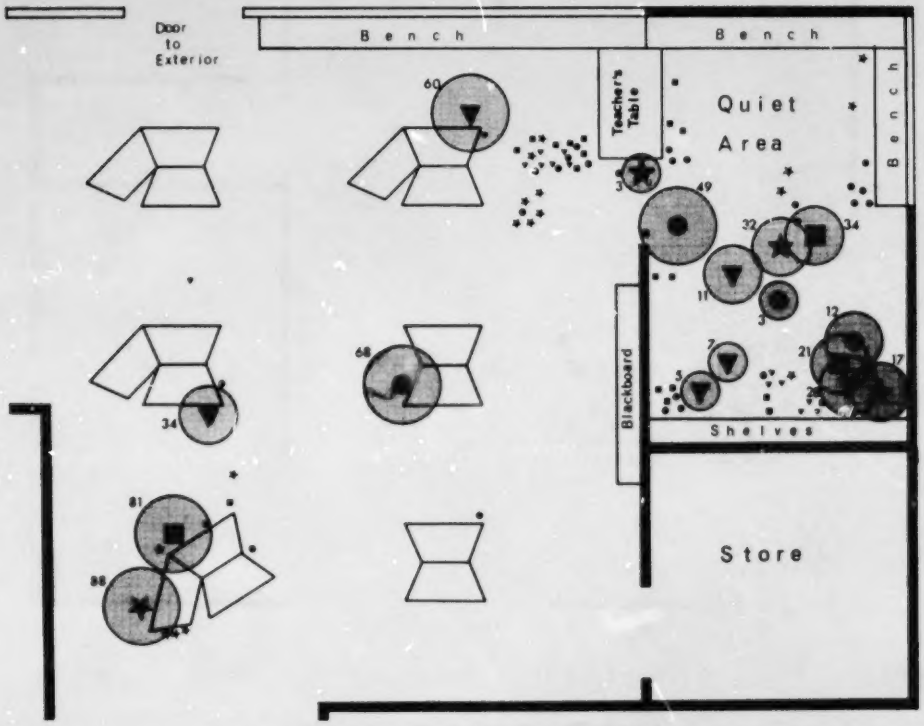

FIGURE 1: PUPIL MOVEMENT IN OPEN PLAN CLASSROOM NO. 2

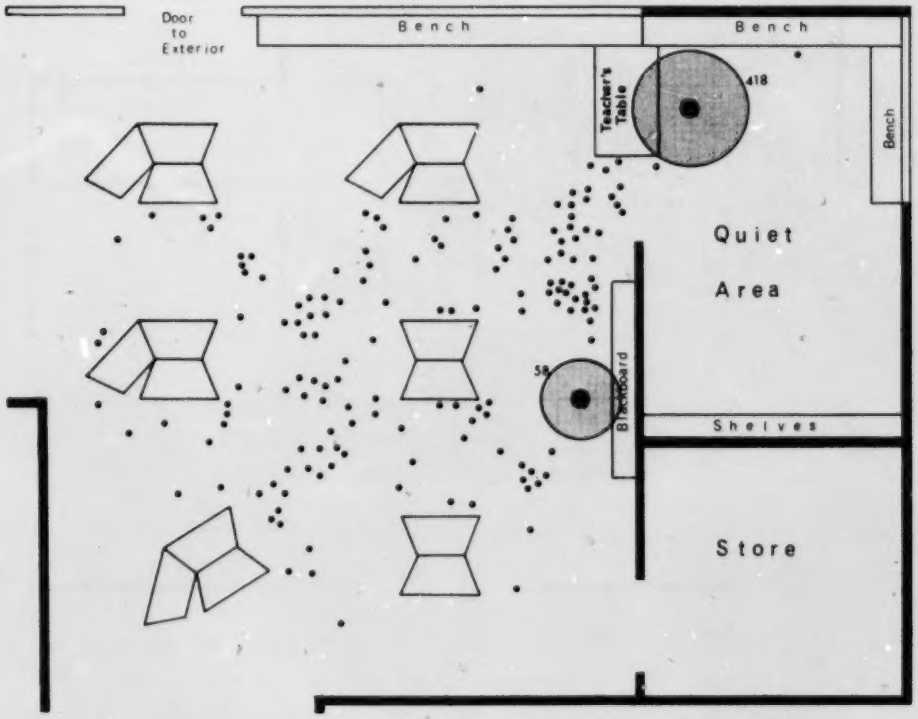

FIGURE 2: TEACHER MOVEMENT IN OPEN PLAN CLASSROOM NO. 2

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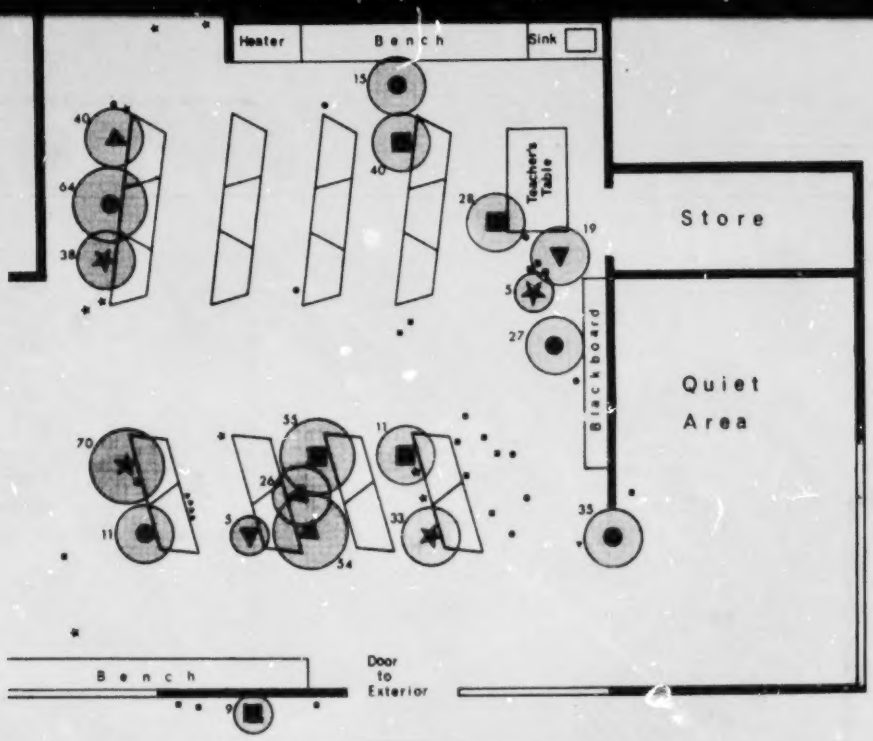

FIGURE 3: PUPIL MOVEMENT IN OPEN PLAN CLASSROOM NO. 6

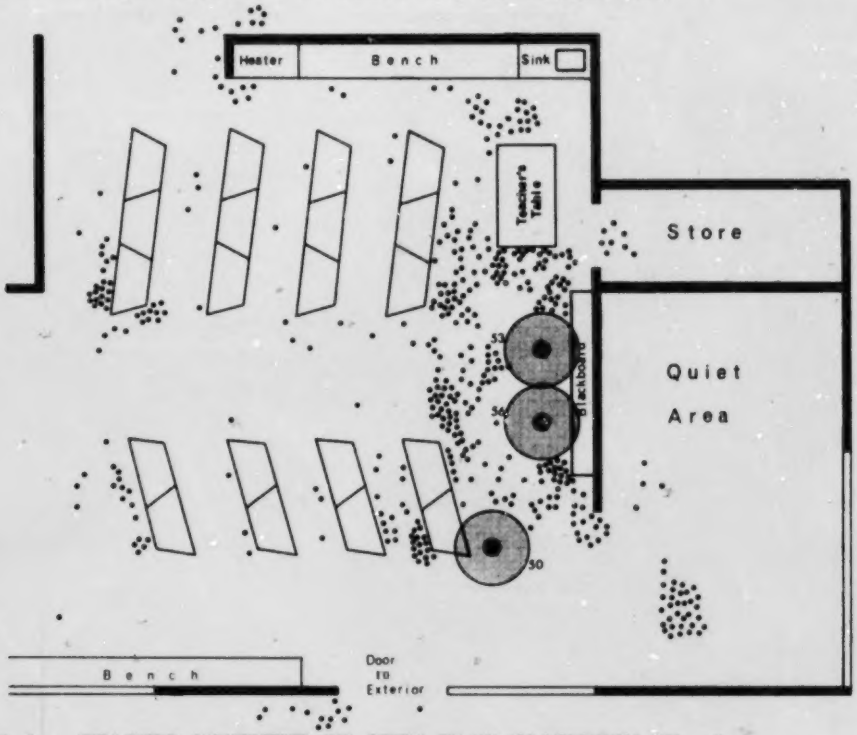

FIGURE 4: TEACHER MOVEMENT IN OPEN PLAN CLASSROOM NO. 6

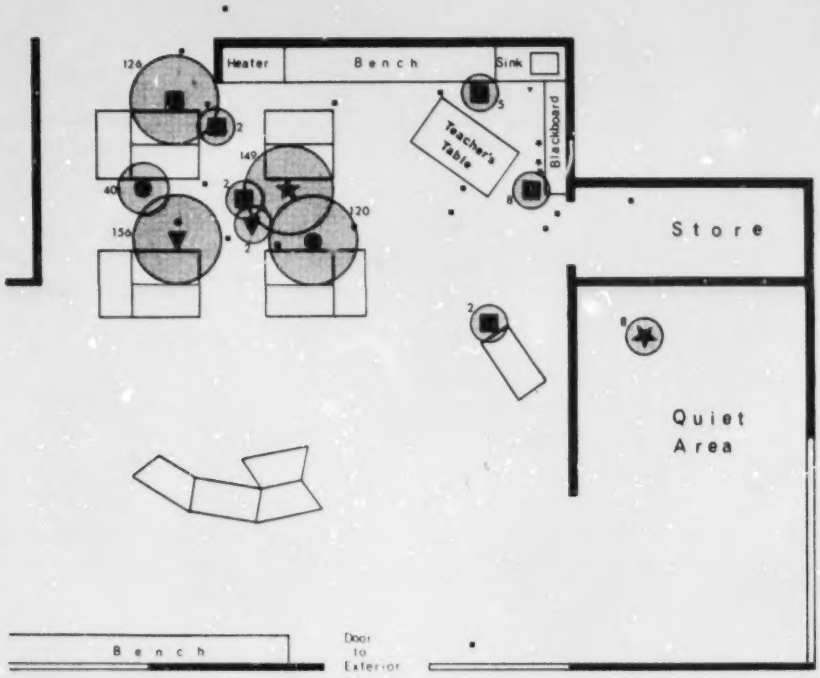

FIGURE 5: CLUSTERING OF PUPIL DESKS IN OPEN PLAN CLASSROOM NO. 8

Secondly, the perimeter identifies the class's territory. It can influence feelings of group identity among pupils. In an open plan situation pupils seated closest to the perimeter may not feel themselves to be closely identified with the class group and may react by drawing closer to the social centre. As well, the teacher herself may feel more secure with a group of children all contained within a clearly defined space. Hall (1966) demonstrates the subtlety and power of these perceptions of space and the need for security and privacy in moderating human behaviour.

Finally, every classroom requires circulation space. The zone between adjoining open plan learning areas and that boardering the conventional classroom are logical spaces to accommodate student traffic, particularly when organisational strategies such as cross grading are adopted. These arrangements usually require groups of children to move from one location to another at the end of each lesson.

In the open plan schools involved in this study, the major learning areas were expected to accommodate a comparable number of children, seated at desks, as in a conventional classroom. Where open plan learning areas are used as conventional classrooms the tendency exists for the perimeter to incorporate a non-functional barrier or zone. When the phenomenon of retraction and concentration of desks occurs then the appearance and effect of confinement and crowding become exaggerated. Under these conditions the open plan arrangement appears to be an architectural provision inferior to the classroom enclosed by fixed walls.

Use of Specialised Facilities

In most of the open plan schools involved in this study one small quiet area is incorporated within each learning space. However, not all specialised facilities are provided on such a liberal basis. Tiled wet areas for practical activities are provided, one per triad of teaching areas; sound proofed withdrawal rooms, one per six teaching areas; library-resource centres, one per school; covered assembly areas, one per school, and uncovered outdoor play areas are accessible from all classrooms.

Where the provision of specialised facilities is less than one per classroom then access requires co-operation and planning between teachers. Under these conditions usage is closely related to the organisational arrangements adopted by the school. Access can range from a laissez-faire, first-come-first-served arrangement, to a rigidly administered booking scheme. Both extremes have their disadvantages. For example, several independent groups attempting to conduct a variety of diverse activities in a withdrawal room can quickly produce a dysfunctional environment for learning. On the other hand, the requirement to make prior bookings does not cater for the spontaneous or unplanned needs of teachers and children.

In the main, this study was not addressed to examining the relationship between usage of the major learning area and other ancillary facilities. The evidence in this study relating to this question is qualitative and is based on the comments of the observers. It does show that persistent interaction among teachers and pupils from adjacent learning areas were not general features of the instructional styles observed. Neither was there an ongoing use of specialised spaces outside the major learning areas and its immediate environs. For most of the children, the majority of learning activities were

conducted in an environment functionally comparable to that of a conventional self-contained classroom. The concept of the school as a total educational resource to be shared by all pupils according to need would not seem to match the reality of events in many of the open plan schools observed in this study.

Mobility of Teachers and Pupils

The picture of the open plan classroom portrayed in the literature, characterised by busy and purposeful movement (or chaos, depending upon the orientation of the author), was not found at the schools included in this study. The differences between conventional and open classrooms were minor with respect to this observational category. In the conventional classrooms an average of 3.2 per cent of the observations were classified as movement and in open plan classrooms movement accounted for an average of 5.4 per cent of the observations. Inspection of the diagrams which plot the movement of the children confirms these results. A large proportion of the time was spent by children seated at their desks. When movement occurred, it was usually the result of a pupil pursuing some legitimate or task oriented classroom activity. Overall, only one per cent of observations were classified as aimless or non-task oriented movement. This finding is at odds with other published results. For example, Lueders-Salmon (1972) found substantial differences between open plan and conventional schools in the amount of pupil movement not specifically directed by the teacher.

The similarity between patterns of movement in the open space and the conventional learning areas is surprising. It was anticipated that children within the open space setting would, in order to take advantage of the specially designed facilities, have to move from a central learning area to the special areas. Yet, as the diagrams show, the observation of a pupil away from his or her desk is an exception. Seat-work predominates. The observers were rarely confronted with the problem that had been initially expected of having to track pupils beyond their immediate home area. In the open plan schools observed, as in the conventional schools, the learning area or classroom was the hub of instruction and very seldom did the pupil leave it. For many children in the open plan school the learning areas could, for all intents and purposes, have been enclosed with bricks and mortar. A number of diagrams could be included to substantiate these observations. Figures 6 and 7 which display pupil movement within a conventional classroom and an open plan learning area are two such examples.

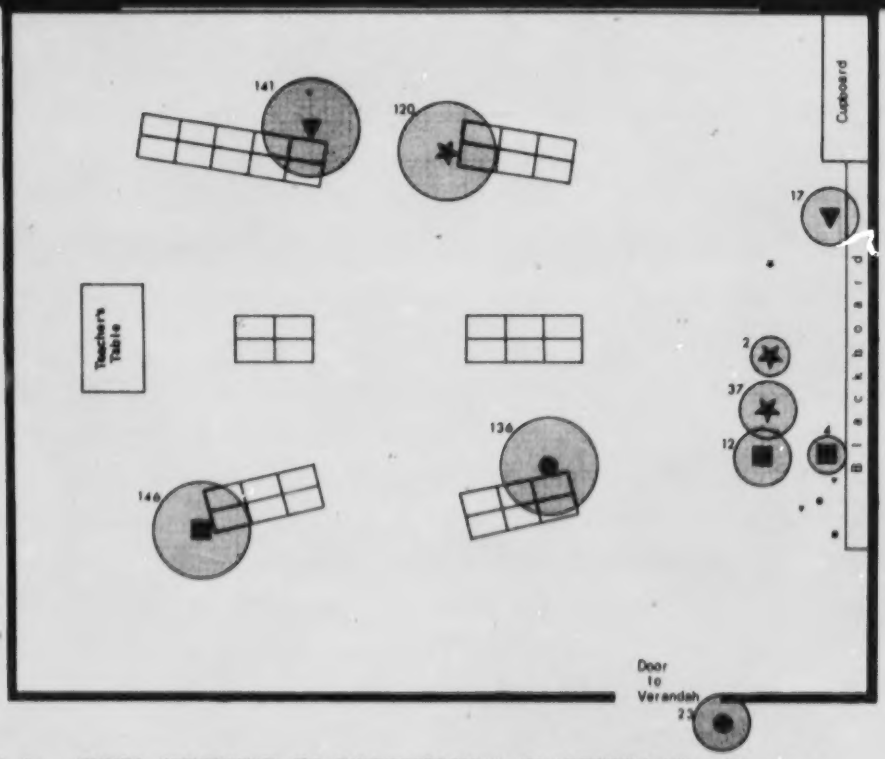

FIGURE 6: PUPIL MOVEMENT IN CONVENTIONAL CLASSROOM NO. 17

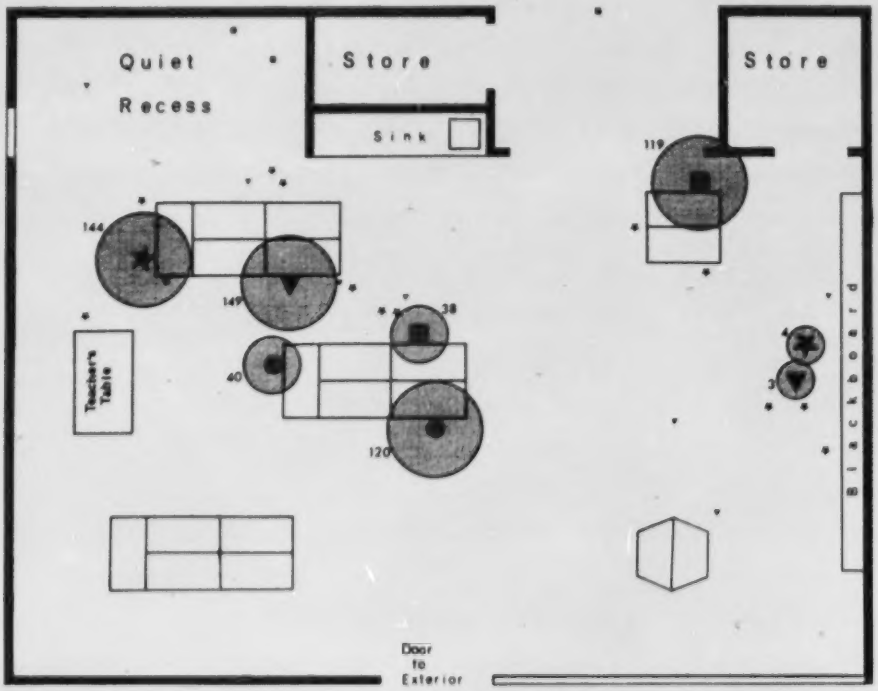

FIGURE 7: PUPIL MOVEMENT IN OPEN PLAN CLASSROOM NO. 1

Naturally, there were exceptions, as Figure 8 illustrates. Some classrooms were characterised by substantially more movement on the part of children, and within classrooms there were variations among the children. As Figure 9 illustrates, there was considerably more movement on the part of two of the four children observed. These two children were the above average achieving pair of the four children observed in that particular home area.

Considerable variation existed in the movement patterns of teachers, though school design did not appear to be a consistent explanatory factor. Some patterns frequently appeared. Teachers spent varying amounts of time supervising learning activities, talking to large groups of children, moving between desks and, less frequently, talking to individual children and small groups of pupils. Usually, there were two foci of movement: the teacher's table and the blackboard. For numbers of teachers, as for example the teacher whose movement pattern is illustrated in Figure 10, the tendency to rely on these two traditional instructional tools was of considerable magnitude and the area surrounding these objects became the teacher's main instructional domain. Pupils located near this area were more likely to be involved in a greater number of contacts with the teacher. A further observation related to the movement pattern displayed in Figure 10, was the closure of the folding doors. The learning area appeared to be functioning as a self-contained classroom.

The pattern of teacher movement and classroom partitioning of Figure 10 affords a dramatic contrast with the teacher traffic shown in Figure 11. Of the eighteen classrooms examined, the behaviour of this teacher appeared least dependent on the blackboard as an instructional tool.

For many teachers the position of the blackboard clearly represented the front of the room and the furniture was oriented accordingly. Unless the teacher's table was located at the rear of the room children located there tended to have fewer visits or close personal contacts with their teacher. Furthermore, the wings of the classroom did not appear to be advantageously placed for the purpose of teacher supervision.

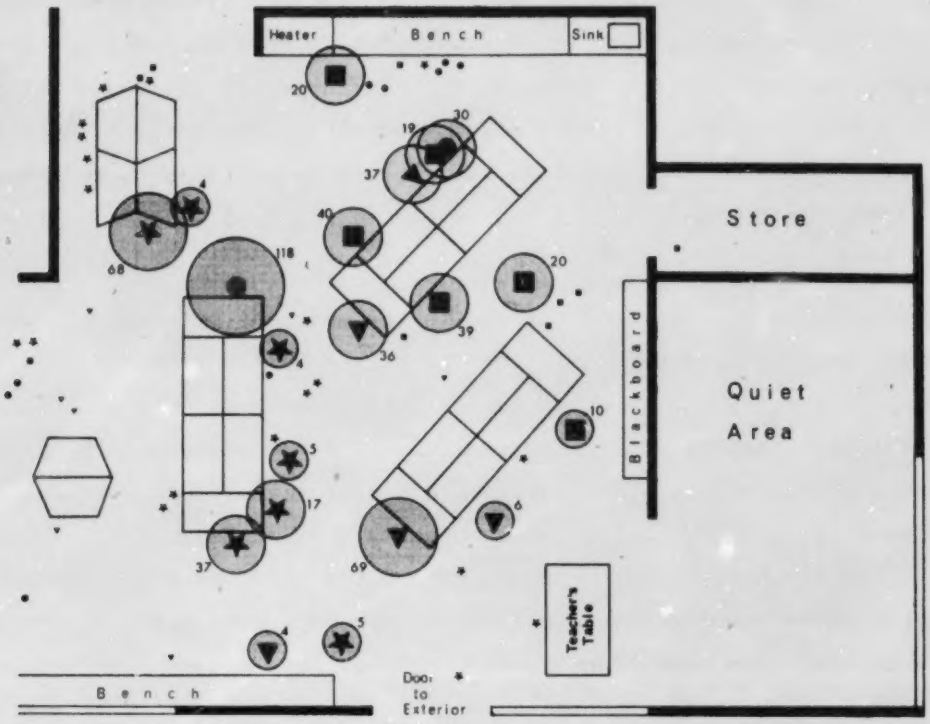

FIGURE 8: PUPIL MOVEMENT IN OPEN PLAN CLASSROOM NO. 4

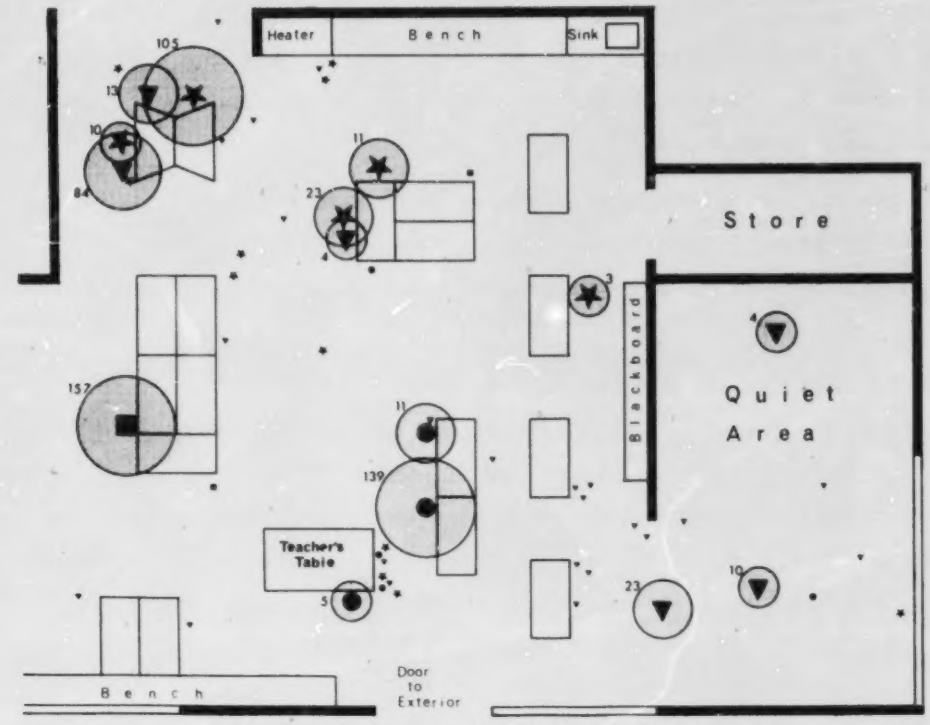

FIGURE 9: PUPIL MOVEMENT IN OPEN PLAN CLASSROOM NO. 7

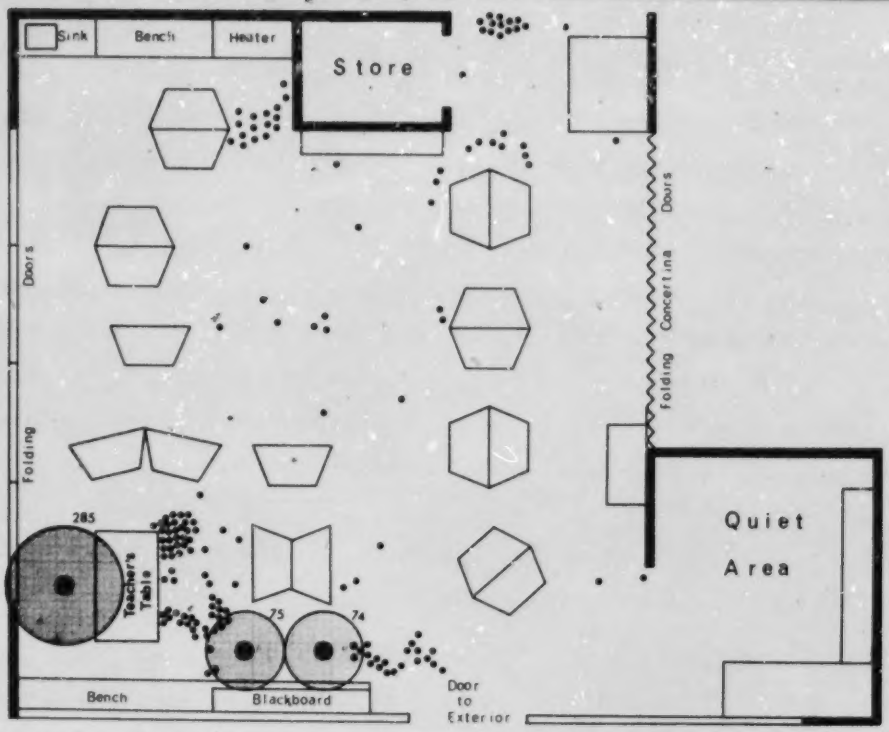

FIGURE 10: TEACHER MOVEMENT IN OPEN PLAN CLASSROOM NO. 5

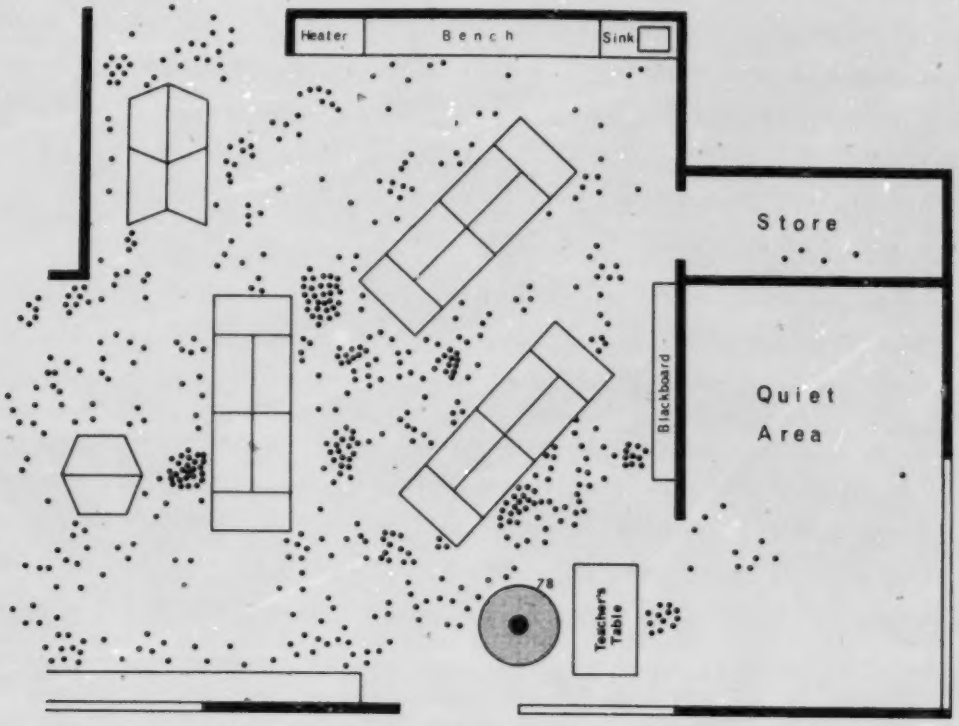

FIGURE 11: TEACHER MOVEMENT IN OPEN PLAN CLASSROOM NO. 4

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Nature of Pupil Groupings

It becomes obvious from examining desk arrangements that small group situations which permit conversation between two or more seated peers are more likely to occur in some classrooms than in others. Desks arranged in circular or rectangular patterns will more successfully facilitate group discussions than isolated pairs or adjoined desks in rows. What is more, the orientation of the desks constitutes what Proshansky and Wolfe (1974) called a *symbolic message*. Teachers who allow children to sit with their backs to the blackboard or teacher's table provide important clues as to their attitude towards small group interaction and supervision. Similarly, teachers who obviously take considerable pains to facilitate simultaneous blackboard viewing from all vantage points in the room indicate attitudes and dispositions towards particular instructional styles.

The identification of this phenomenon is not a startling discovery. Dreeben (1973) discusses the research evidence regarding the spatial distribution of *talk* and the evidence that suggests that most of it occurs towards the front and centre of classrooms. Dreeben advances as an explanation of this phenomenon the containment of 30 children and a teacher into a confined space and the resulting pressure on teachers to manage events by working from the front of the class asking questions and directing activities. The evidence from the present study suggests that a physically confined space is not the only influence that disposes teachers to adopt this instructional mode.

Proshansky and Wolf's point is illustrated in a conventional classroom by Figure 12 where all the desks are carefully oriented towards the blackboard. Figure 4, referred to earlier, shows the same pattern in an open plan classroom.

In this study the identification of a particular desk with an individual child was also a practice that varied between classrooms regardless of whether they were of open plan or traditional design. In very few classes observed did any child work at one particular desk for all subjects throughout the period of observation. Hence, for most children, the peers with whom they could communicate varied during different phases of instruction or during different lessons. Often, however, the number of children with whom a particular child could talk while seated was small.

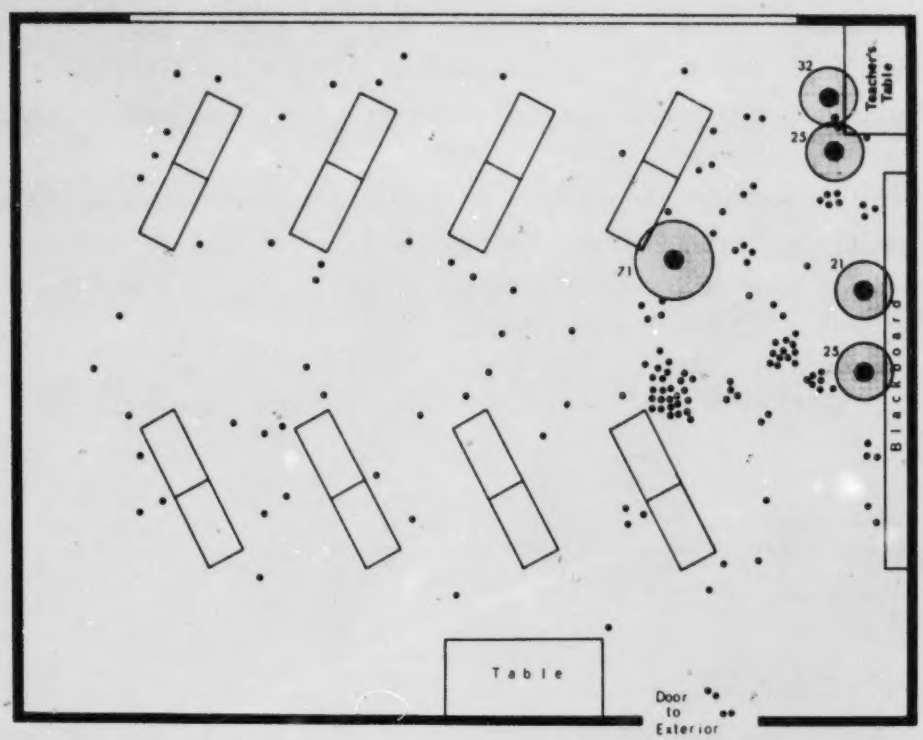


FIGURE 12: ORIENTATION OF PUPIL DESKS TOWARDS BLACKBOARD IN CONVENTIONAL CLASSROOM NO. 14

Based only upon the diagrams of pupil movement it is difficult to arrive at a firm conclusion that the open plan classrooms in this study were any more characterised by fluid pupil groupings than classrooms in schools of traditional design.

Individual and Small Group Pupil-Teacher Contact

Burnham (1970) writes of open plan schools:

> If two words can distinguish the flexible open plan school from its predecessor, these words must be 'interaction' and 'accessibility'. A marked increase in interactions between teacher and teacher and also between pupil and pupil (but not necessarily more teacher-pupil exchanges) and the ready accessibility to learning resources are to be noted in open plan schools. (p.1)

It would seem that Burnham's conclusion of greater pupil-pupil interaction is not a necessary concomitant of open planning. In the present study, the pupil-pupil interactions were of similar frequency in classrooms of conventional and open plan design, but the incidence of pupil-teacher interactions favoured the open plan classrooms, though the margin was small. Table 1 indicates the comparability of task and non-task interaction frequencies drawn from the combined Stage I and Stage II data.

TABLE 1: TASK AND NON-TASK BEHAVIOUR IN OPEN PLAN AND CONVENTIONAL DESIGN CLASSROOMS (percentage of total behaviour observed)

	Open Plan %	Conventional %
Pupil by Self:		
Task	49.4	54.1
Non-Task	11.5	12.6
Pupil and Peer Interactions		
Task	12.2	12.7
Non-Task	6.5	5.3
Pupil and Teacher Interactions		
Task	20.3	14.1
Non-Task	0.5	1.1
	100.4*	99.9*

* Totals do not sum to 100 per cent due to rounding errors in computation.

Overall, the percentages of observations classified as task and non-task were comparable. Where differences occurred in the nature of the behaviour classified as task, conventional classrooms were, on average, characterised by more individual pupil work, and the open plan learning areas by more pupil and teacher interaction. Surprisingly the amount of peer interaction was quite comparable.

The data from Stage II of the study showed that a child spent, on average, 67.7 per cent of the time working by itself and 17.1 per cent interacting with children in groups ranging from two to five in number. These figures offer a salutory reminder to those educationists who fear

that large quantities of prime instruction time is being consumed by non-productive talk with peers. Considering the importance that is currently attached to the development of communication skills, co-operation and small group skills and group problem-solving skills, an average of 17.1 per cent appears a most moderate investment of time. Small differences occurred between open and conventional classrooms: on average 15.3 per cent more individual and 6.6 per cent more small group work occurred in the open plan classrooms.

The percentages of time each child was observed interacting with a teacher, either individually or as a member of a small group, varied considerably within each classroom and between classrooms. Again, there appeared to be no consistent pattern within classrooms of either open plan or conventional design and the average percentages were similar for both types of classroom. Reference has already been made to the similarity among desk arrangements and this may be a significant factor contributing to the absence of differences. Table 2 containing data from Stage II of the study demonstrates this pattern.

TABLE 2: PUPIL-TEACHER INTERACTION IN OPEN PLAN AND CONVENTIONAL DESIGN CLASSROOMS (percentage of total behaviour observed)

	Pupil-Teacher Interaction For All Four Pupils Within the Classroom	
	Average %	Range %
Open Plan Classroom No. 1	1.3	0.6 - 1.9
3	3.4	2.5 - 4.4
4	2.5	0.6 - 5.6
6	8.6	2.5 -16.3
8	2.2	0.0 - 6.3
11(a)	1.9	0.6 - 3.1
11(b)	0.9	0.0 - 2.5
Overall Average	2.9	
Conventional Classroom No. 12	1.4	0.6 - 1.9
17	5.2	3.8 - 7.5
18	3.0	0.6 - 6.3
Overall Average	3.2	

The average percentage of observations classified as individual or small group interactions involving pupils and teachers was 2.9 per cent in open plan classrooms and 3.2 per cent in conventional classrooms. However, with respect to the range of interactions, the largest was found among open plan classrooms. One child in one open plan situation was recorded with only 2.5 per cent of the total observation time in direct contact with the teacher. Another child in the same class but on different occasions was, as an individual or as a member of a small group, in direct contact for 16.3 per cent of the total observation time. In two other open plan classrooms, one child in each classroom was observed having no direct contact with the teacher, either as an individual or as a small group member.

The Behaviour of Above and Below Average Achieving Pupils

Consistently in both open plan learning areas and conventional classrooms, the higher achieving pupils were observed participating in more task oriented behaviour. Table 3 illustrates the consistency across both types of classroom in the differences between task and non-task behaviour of above and below average achieving pupils. The information in Table 3 is drawn from the combined data of Stage I and Stage II.

TABLE 3: TASK AND NON-TASK BEHAVIOUR OF ABOVE AND BELOW AVERAGE ACHIEVING PUPILS IN OPEN PLAN AND CONVENTIONAL DESIGN CLASSROOMS (percentage of total behaviour observed)

	Open Plan %	Conventional %
Above Average Achieving Pupils:		
Task	86.3	84.4
Non-Task	14.0	15.5
	100.3*	99.9*
Below Average Achieving Pupils:		
Task	77.4	77.5
Non-Task	22.7	22.4
	100.1*	99.9*

* Totals do not sum to 100 per cent due to rounding errors in computation.

The higher achieving pupils were also observed engaging in more task oriented interactions with the teacher. For the combined data an average of 14.4 per cent of the observations in conventional classrooms and 19.0 per cent in open plan classrooms were classified as communication between pupil and teacher. The respective figures for below average achievers were 10.1 per cent and 15.6 per cent.

Differences in the distribution of pupil-teacher contacts have been described in other studies. Jackson and Lahaderne (1967) write:

> In each classroom there are a few students who are almost out of the teacher's range of vision, so to speak, and a few others who are almost always underfoot. What this difference means and how it comes about is anybody's guess, but it is fair to conclude that by the end of the year some students likely will be more familiar to the teacher than others even though they will have all lived together in the same room for about the same number of days. (p.134)

Garner and Bing (1975) discovered from their observation study a trend for children who are not distinctive in either personality or conduct to receive less than average contact with the teacher. The present study suggests that low achievement might also be a feature among children which discourages teacher contact. These results may contradict the impressions that many teachers have of their behaviour, particularly in view of the importance that is currently attached to the function of remedial education.

Finally, Table 4 provides another perspective on behaviour differences among children of different achievement levels. Based on Stage II data only, differences occurred not only between the behaviour of pupils in the two design types, but also between two achievement groups in the open plan situation. Below average pupils, especially in open plan classrooms, were more likely to be engaged in behaviour different from that of the majority of their class peers.

TABLE 4: FREQUENCY OF BEHAVIOUR CLASSIFIED AS A-TYPICAL OF MOST CLASS PEERS OF ABOVE AND BELOW AVERAGE ACHIEVING PUPILS IN OPEN PLAN AND CONVENTIONAL DESIGN CLASSROOMS (percentage of total behaviour observed)

	Open Plan %	Conventional %
Above Average Achieving Pupils	21.2	8.0
Below Average Achieving Pupils	29.5	9.3

RESEARCH IMPLICATIONS

Plotting the movement of teachers and pupils is not a conceptually demanding task. Little can be inferred from this type of evidence when it has been collected over a short period of time. However, when viewed in the context of classroom layout and in association with other descriptors of the ongoing teaching and learning processes, the patterns of movement when charted over larger time segments can provide compelling evidence regarding the usage of school buildings and their facilities.

In appraising the results, readers are cautioned to avoid reading more into the data than is warranted. A teacher may still be as warm and efficient a person when dealing with children from a fixed position at the front of a classroom as a teacher who meanders about the learning area superficially dealing with enquiries as they arise. In addition, continual or persistent contact between teacher and the pupil may not be conducive to efficient learning in all instances. Purely quantitative accounts of the distribution of teacher and pupil contact have inherent weaknesses. The quality of the exchange between the teacher and the pupil is more than likely the most critical factor in the teaching process.

Possible refinements to the study come easily to mind. A mapping of traffic patterns within the total school campus would provide a more complete picture of the usage of school facilities. Analysis of behaviour of children and teachers within specified year levels or age cohorts and within specified subject areas may disclose consistent and differing trends. The sampling of a larger number of children would provide a more comprehensive picture of building usage. However, these elaborations could not be achieved without additional costs. The results from the present study would suggest that such extensions could represent a worthwhile investment.

For architects interested in pursuing such fundamental questions as *How do we build better schools?* the mainstream of educational research literature appears largely irrelevant. There is little guidance from the literature that would appeal to the architect. We know very little about how the architecture of school buildings influences learning. Considering the amount of expenditure invested in school buildings and the assumptions that are made about the effects of this expenditure the lack of research is

surprising. The present study has sought, in a small way, to provide some basic data which may facilitate a discussion of this topic. Inevitably, as the cost of school buildings escalate and as the community grows more weary of committing substantial funds to the construction of school buildings, there will be pressure on administrators to demonstrate that facilities that have been provided at such cost are being used, and used well.

CONCLUSIONS

This study was addressed to the behaviour of pupils and their teachers in 11 learning areas of open plan and seven of conventional design. Among the 18 classrooms, differences were found in the usage patterns of the major learning areas and in the nature and frequency of interaction between pupils and teachers. In the main, school design did not appear to be a critical factor that could explain most of these differences.

The picture that emerged from the observations and which generally applied to classrooms of both designs was of purposeful, lesson oriented instruction, though there was a tendency for more variety of pupil behaviour to occur in the open plan classrooms. Compared with their peers in the conventional classrooms, pupils in the open plan classrooms were less often observed working by themselves but more often observed in small group work and in communication with their peers and teachers. In short, the teachers appeared less often to orchestrate the activities of all members of the class at once. What is important to note is that in spite of the variability of behaviours evident in the open plan situations this pattern did not result in a substantial diference in the amount of task behaviour.

On average, pupils spent two-thirds of their time working without direct reference to their teachers or peers. Less than one-fifth of the observation time involved pupils working in small group situations. For about one-sixth of the time the behaviour of the observed pupils was a-typical of other children in the classroom and movement accounted for, on average, five per cent or less of the total observations. When these results are viewed in association with the actual *patterns* of movement of teachers and pupils, we conclude that on the whole instruction and learning experiences were being conducted along relatively traditional lines.

Within conventional and open plan classrooms teachers spent unequal amounts of time instructing certain children either individually or within small groups. The magnitude of the difference is surprising. Of itself, this finding need not be viewed as alarming so long as one assumes that the inequality is intentional rather than due to accident or neglect. However, discovering that above average achieving children were favoured by a greater number of contacts with teachers should give cause for some reflection.

There was no consistent evidence to suggest that architectural design accentuated the unevenness of distribution of pupil-teacher contacts.

Because open plan buildings are a relatively new concept, some critics seem eager to leap to the conclusion that they are harbingers of educational progressivism. However, the results of this study should discourage commentators from automatically associating a particular teaching style with a particular school design type. Three major reasons are cited to explain this finding. Firstly, at least in Western Australia, the schools were not designed specifically to facilitate progressive teaching practices. School designers opted for a 'flexible' design. Secondly, it is proposed, school design is a less powerful determinant of teacher behaviour than school organisation and teacher tradition. The most logical intents of architects will always succumb to the practicalities of the complex social structure and administration of the school. Thirdly, among the schools participating in the study, the differences in design between open plan and conventional classrooms were less real than first imagined. Each teacher in an open plan school was assigned to a learning area that from many points of view was as self-contained as any conventional classroom. While it may lack enclosing walls and have, close at hand, a store room, withdrawal room, wet and quiet areas, the main open plan learning area has comparable dimensions to those of a conventional classroom. Each area is supplied with a blackboard, a teacher's table, and a desk and chair for each pupil. The class-size group is still very much conceived as a fundamental teaching unit.

It appears that although architectural features may facilitate or inhibit particular styles of teaching they are, at least as far as contemporary school buildings are concerned, not a decisive influence. One wonders whether school designers have heeded the literature of writers such as Drew (1970) who after a review of available evidence concluded:

> My view of the principles, implementation and educational consequences of open space has led me to question whether open space as a blanket solution to educational planning has any greater validity than the traditional enclosed classroom. Both approaches seem to be almost as arbitrary and, consequently, irrelevant to the educational process. The mistake made by the open spacers was to insist that there was one architectural solution that could be everything to everybody. (p.56)

It is conceivable that more radical changes to school design, such as the absence of fixed blackboards, and the provision of learning areas which force teachers to adopt different grouping arrangements, could have a greater influence but there would be no guarantee that the practices would be for the better unless teachers adopt them for professional reasons and of their own choice.

REFERENCES

Allen, D. Ian. *Open Plan - A Canadian Investigation.* (Memorandum No. 3). Stanford, California: School Environment Study, 1972.

Boydell, Deanne. Teacher-Pupil Contact in Junior Classrooms. *British Journal of Educational Psychology,* 1974, 44, 313-318.

Burnham, Brian. *A Day in the Life: Case Studies of Pupils in Open Plan Schools.* Aurora, Ontario: York County Board of Education, 1970.

Central Advisory Council for Education. *Children and their Primary Schools.* London: H.M.S.O., 1967. (Plowden Report).

Department of Education and Science. *Building Bulletin 47: Eveline Lowe School Appraisal.* London: H.M.S.O., 1972.

Dreeben, Robert. The School as a Workplace. In Travers, R.M. (ed.) *Second Handbook of Research on Teaching.* Chicago: Rand McNally, 1973, 450-473.

Drew, Clifford J. Research on the Psychological Behavioral Effects of the Physical Environment. *Review of Educational Research,* 1971, 41, 447-465.

Drew, Philip. Open Plan. *Canadian Architect,* 1970, 15, 46-57.

Dunkin, M.J. and Biddle, B.J. *The Study of Teaching.* New York: Holt, Rinehart and Winston, 1974.

Education Department of Western Australia. *Brief for the Construction of Primary Schools in Western Australia.* Mimeograph, September 1975.

Ellison, M., Gilbert, L. and Ratsoy, E.W. Teacher Behaviour in Open-Area Classrooms. *Canadian Administrator,* 1969, 8(5), 17-21.

Fitzpatrick, G.S. and Angus, M.J. *Australian Open Area Schools Project, Technical Report No. 1: Through Teachers' Eyes: Teaching in an Open Space Primary School.* West Perth: Education Department of Western Australia, 1974.

Garner, J. and Bing, M. Inequalities of Teacher-Pupil Contacts. *British Journal of Educational Psychology,* 1973, 43, 234-243.

Hall, Edward T. *The Hidden Dimension: Man's Use of Space in Public and Private.* London: The Bodley Head, 1966.

Hamilton, W.L. The Multiple Area Primary School. *Quest,* 1972, 10, 11-15.

Jackson, Philip W. and Lahaderne, Henriette M. Inequalities of Teacher-Pupil Contacts. *Psychology in the Schools,* 1967, 4, 204-211.

Lueders-Salmon, Erika. *The Active Classroom: A Comparison of Team Teaching and Self-Contained Classroom Schools.* (Technical Report No. 31.) Stanford, California: Stanford Centre for Research and Development in Teaching, 1972.

Nuthall, G.A. Types of Research on Teaching. *New Zealand Journal of Educational Studies*, 1968, 3, 123-147.

Palmer, S.R. The Philosophy of the Primary Division. *Education*, 1973, 22(2), 3-11.

Proshansky, E. and Wolfe, M. The Physical Setting and Open Education. *School Review*, 1974, 82, 557-574.

Rathbone, Charles H. Examining the Open Education Classroom. *School Review*, 1972, 80, 521-551.

Resnick, Lauren B. Teacher Behaviour in an Informal British Infant School. *School Review*, 1972, 81, 63-83.

Simon, A. and Boyer, E.S. *Mirrors for Behaviour: an Anthology of Classroom Observation Instruments*. Philadelphia: Research for Better Schools, Inc. 1967.

Sommer, Robert. *Personal Space*. New Jersey: Englewood Cliffs, 1969.

Walker, R. and Adelman, C. Interaction Analysis in Informal Classrooms: A Critical Comment on the Flanders' System. *British Journal of Educational Psychology*, 1975, 45, 73-76.

APPENDIX 1

The Development of Open Plan Design in Western Australian Government Primary Schools

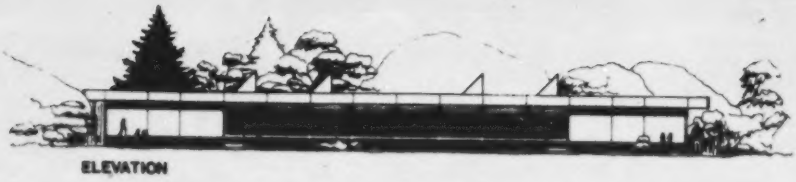
1968 Model

ELEVATION

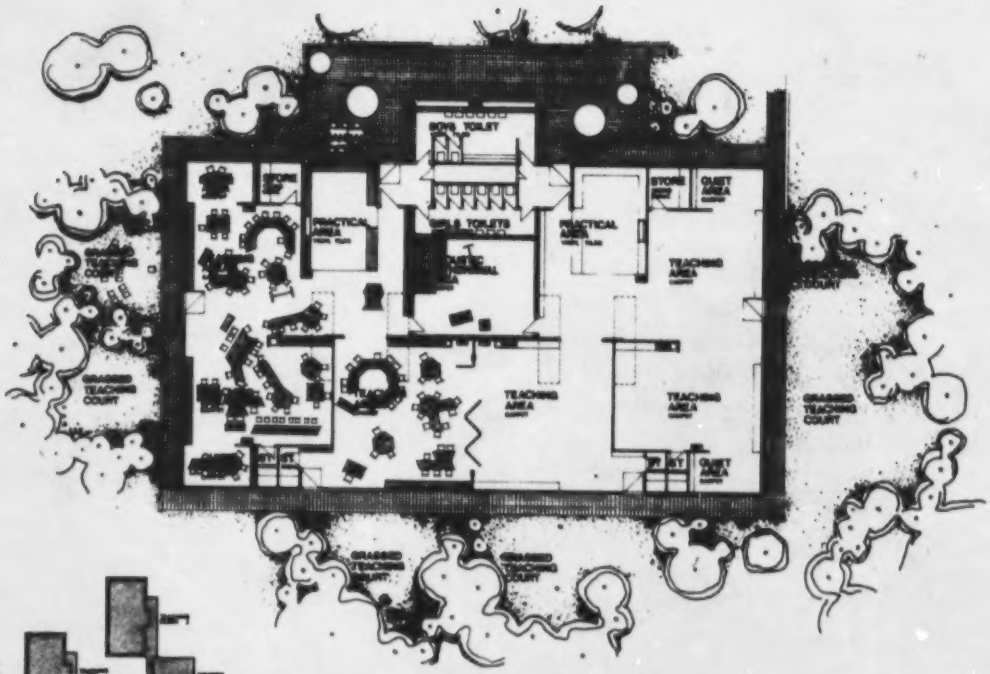
SITE PLAN

FLOOR PLAN

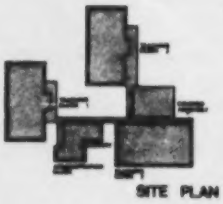
1969 Model



ELEVATION

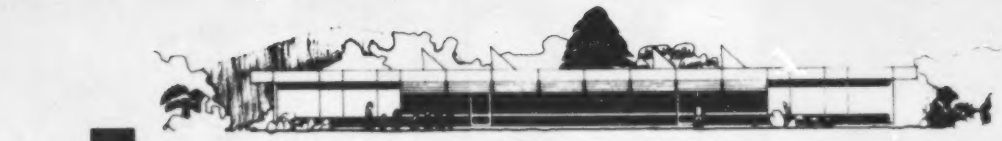


FLOOR PLAN



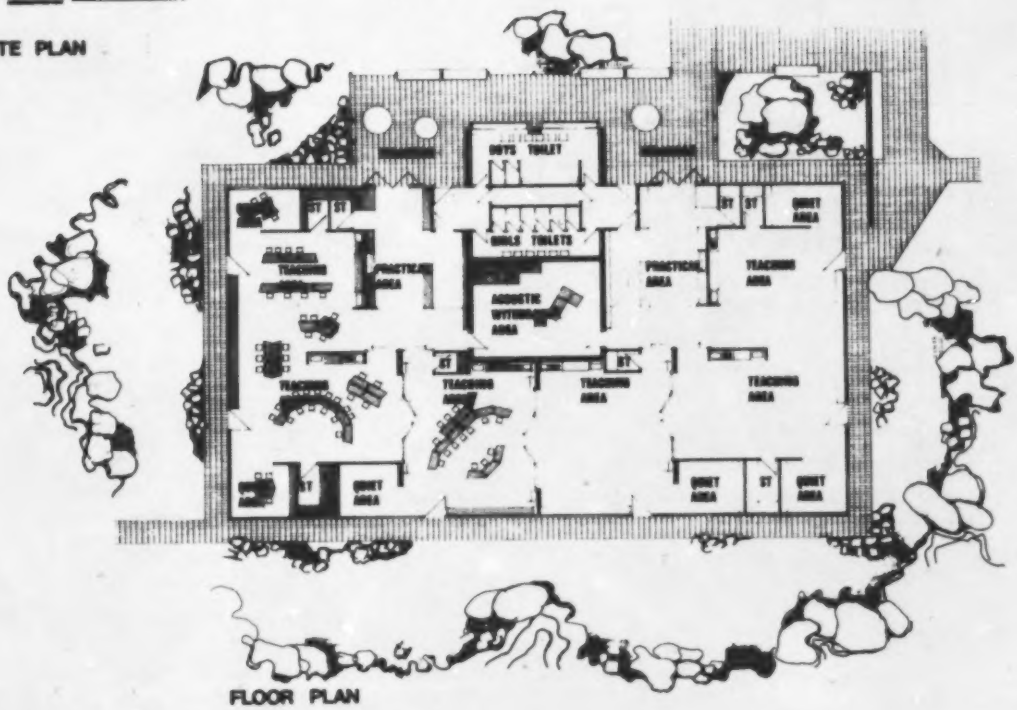
SITE PLAN

1970 Model



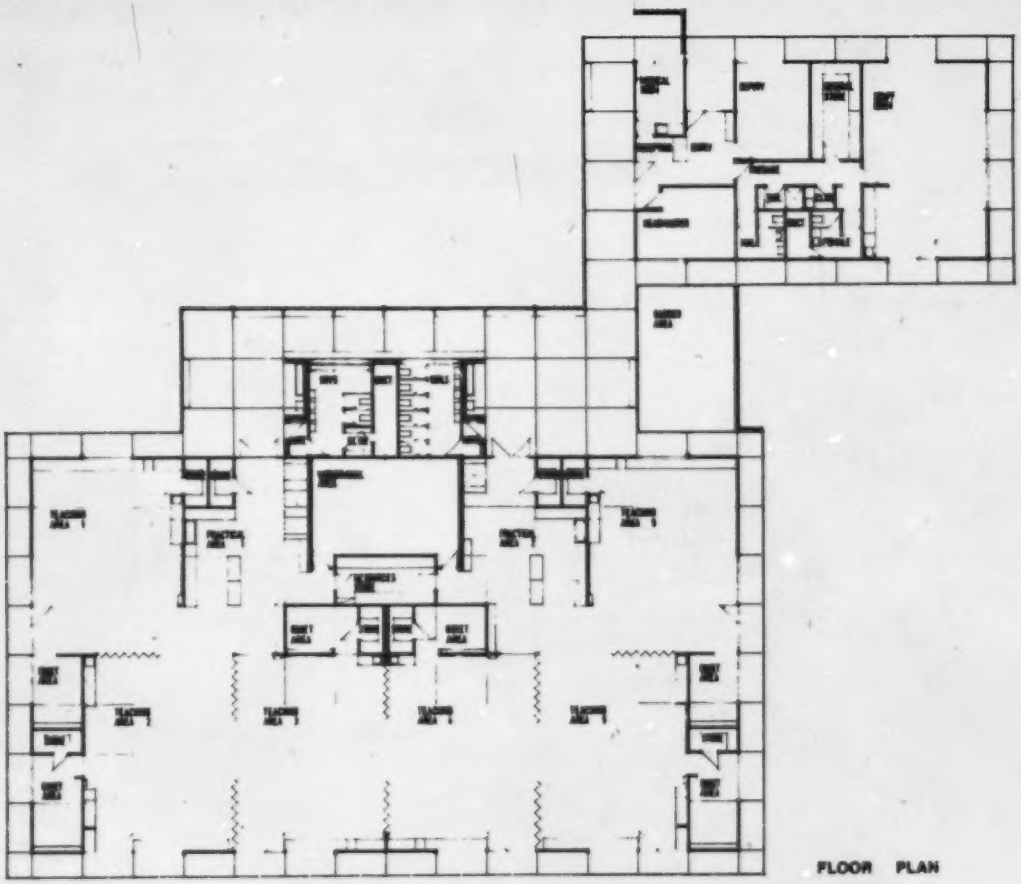
ELEVATION

SITE PLAN



FLOOR PLAN

1972 Model



FLOOR PLAN

APPENDIX 2

Definitions of Behavioural Dimensions

Dimension 1: Discrimination Between Task and Non-Task Behaviour

Task Behaviour

This may be defined to include any behaviour which contributes to the fulfilment of generally accepted classroom educational objectives or apparently facilitates the learning process of the child or his peers. The behaviours would include those that most teachers would agree a child might gainfully exhibit and which deserve promotion in the classroom.

Non-Task Behaviour

This category includes any behaviour which hinders the attainment of the classroom or school objectives or which, in the view of most teachers, has little educational merit. Examples would include aimless wandering or disruptive shouting.

Dimension 2: Discrimination Between Communication, Movement, Activity and Inertness

Communication

The interchange of information. A meaningful verbal exchange between the child and his peers or teacher, but excluding recitation or drilling.

Movement

The progression of the child from one location to another.

Activity

Behaviour other than movement or communication. This category includes most of the behaviours that the child is likely to exhibit in the classroom.

Inertness

No movement, no communication, or no activity as previously defined. This category would also apply if the child was seated with hands held on head, or was standing in a queue.

These categories are not always discrete. On some occasions the child may even exhibit movement, communication and activity simultaneously. For example, the child may move along talking to a teacher or peer and at the same time be demonstrating some activity. To obviate the problems of recording this information an entry is made in all three categories. As a general rule, however, multiple entries should be avoided.

Dimension 3: Patterns of Interaction

Child

This category is used when the child is alone and is not interacting with another person.

Child and Peer

When the child is interacting with another child. This may be only an inferred interaction such as the child listening to a conversation between two other children.

Child and Teacher

When the child is interacting with the teacher or other adult in the room. This includes occasions when the teacher is giving general directions to which the child should be listening and responding.

Dimension 4: Typical Behaviour

An indication of whether the behaviour of the child being observed is typical or a-typical of the behaviour of the majority of children in the class-size group at the time of observation.

Dimension 5: Numbers Interacting

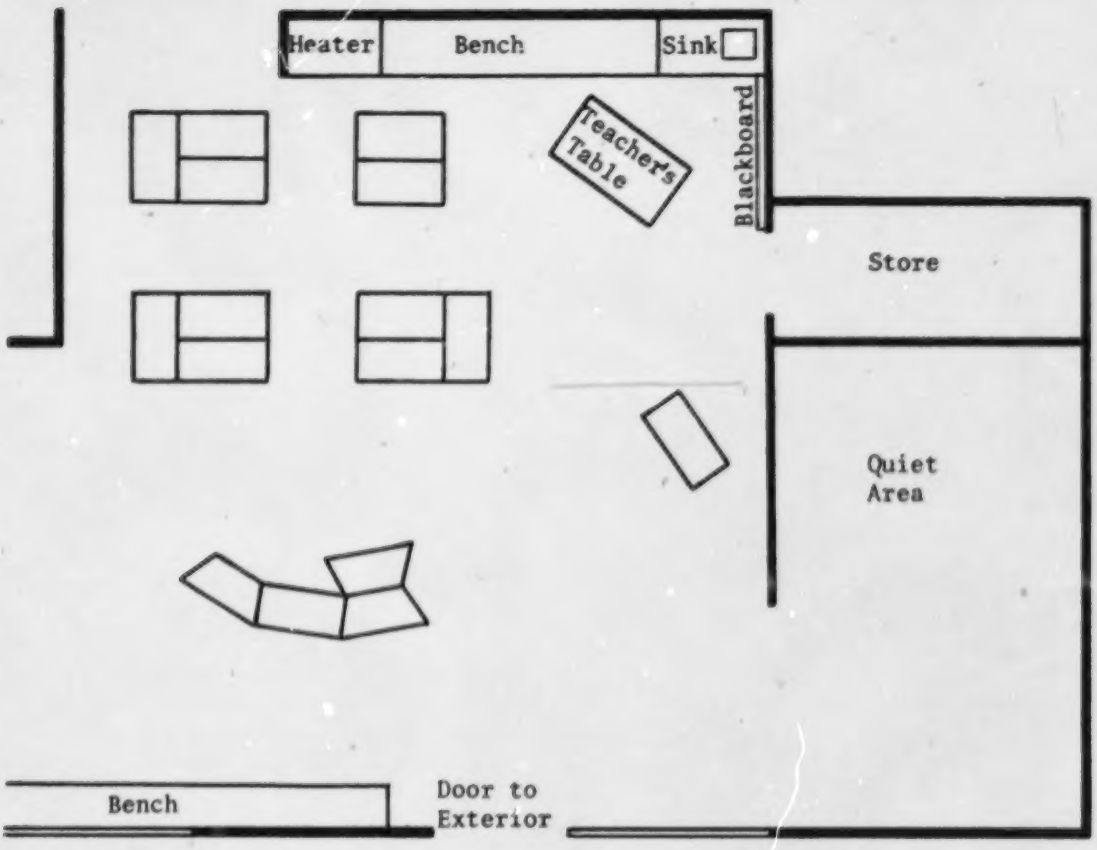
An indication of the size of the interacting group at the time of the observation. Check the appropriate box:

1	if the child is alone,
2-5	if the child is a member of a group of two to five persons,
6-10	if the child is a member of a group of six to ten persons, or
11+	if the child is a member of a larger size group.

APPENDIX 3

Observation Recording Sheet

(one sheet completed for each 30 second observation period)



	Child			Child & Peer			Child & Teacher		
	A	M	I	A	M	C	A	M	C
Task									
Non-Task									

A: Activity
M: Movement
I: Inertness
C: Communication

Typical Behaviour	
No	Yes

Numbers Interacting			
1	2-5	6-10	11+

APPENDIX 4

Patterns of Pupil and Teacher Movement Observed in all Classrooms Involved in the Study

The locations of pupils and teachers for the entire observation period in each classroom are plotted on separate diagrams.

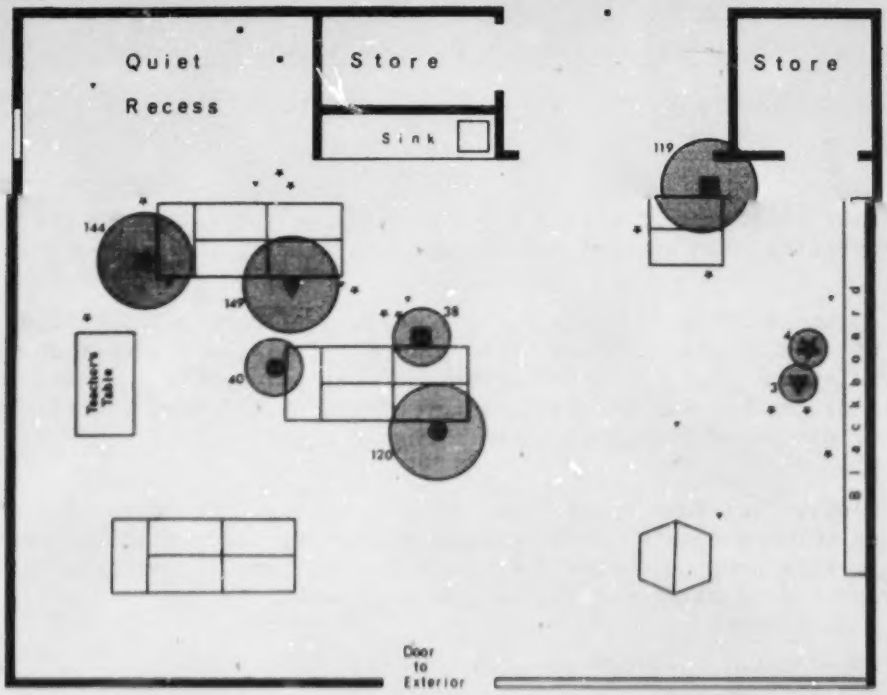
Symbols are used to mark the locations of pupils and teachers at the end of each 30 second observation period. A single observation is marked by one symbol alone. Shaded areas encircling a symbol indicate that a pupil or teacher was observed at approximately the same location for the number of observations specified alongside.

Individual pupils are identified by separate symbols. The star and triangle represent the above average achieving pair while the square and circle represent the below average achieving pair. Teacher locations are represented in all cases by the circular symbol.

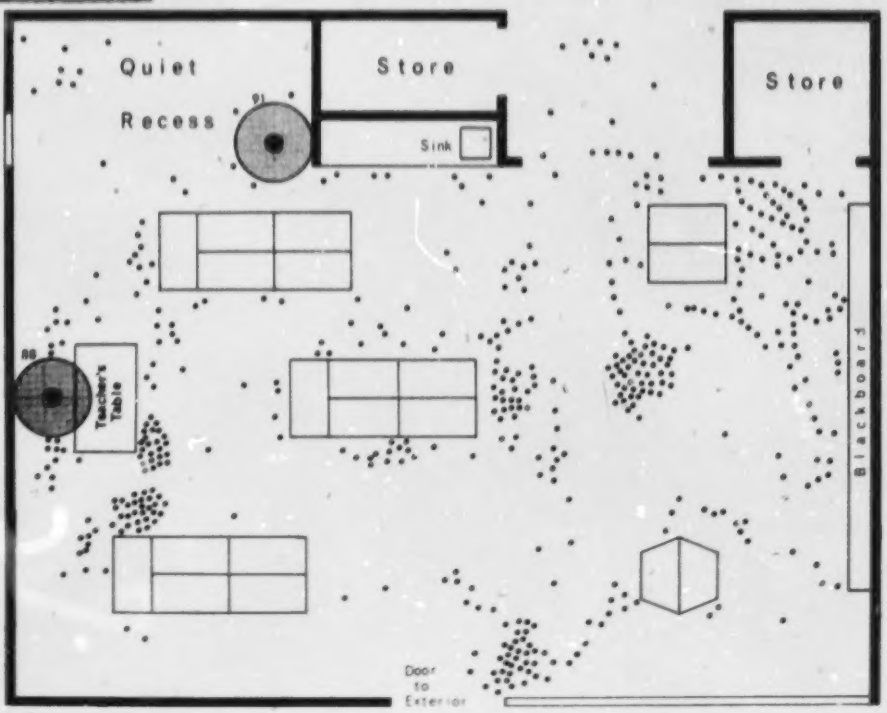
For each diagram of the open plan classrooms (No. 1 to No. 10) reference is made to the year model of the school as shown in Appendix 1, and to the location of the particular classroom or teaching area within the model.

Classroom No. 1: Open Plan 1968 Model - lower right hand classroom

Pupil Movement

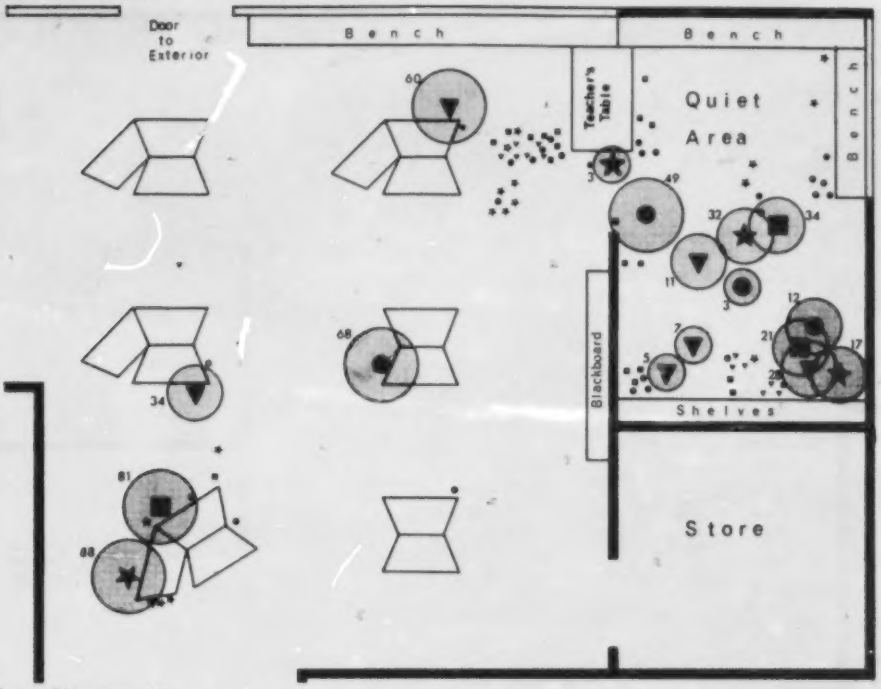


Teacher Movement

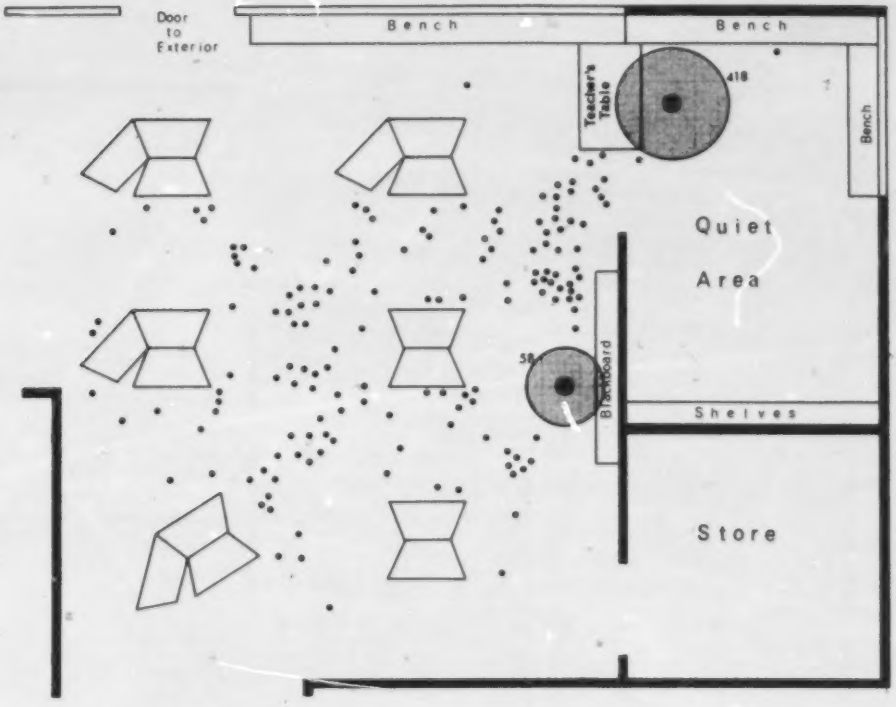


Classroom No. 2: Open Plan 1969 Model - upper left hand area

Pupil Movement

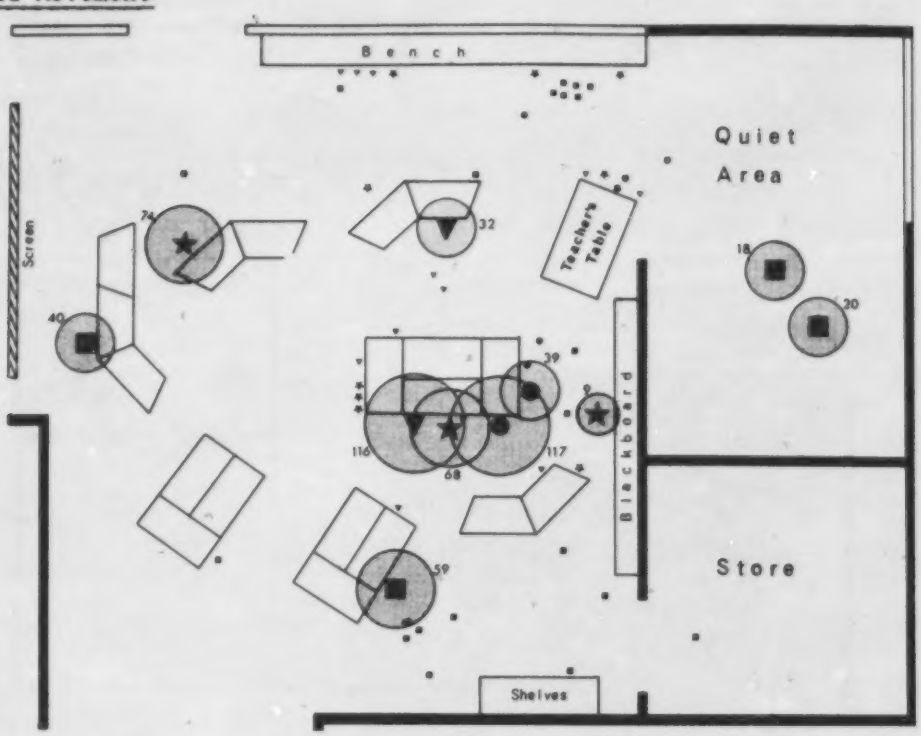


Teacher Movement

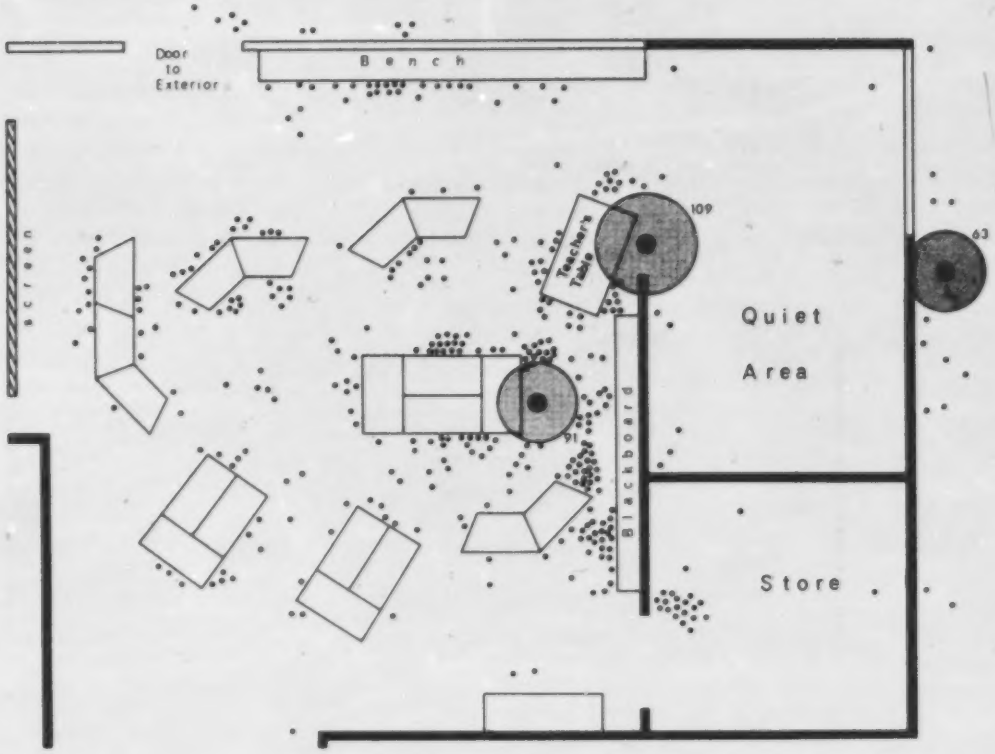


Classroom No. 3: Open Plan 1969 Model - upper left hand area

Pupil Movement

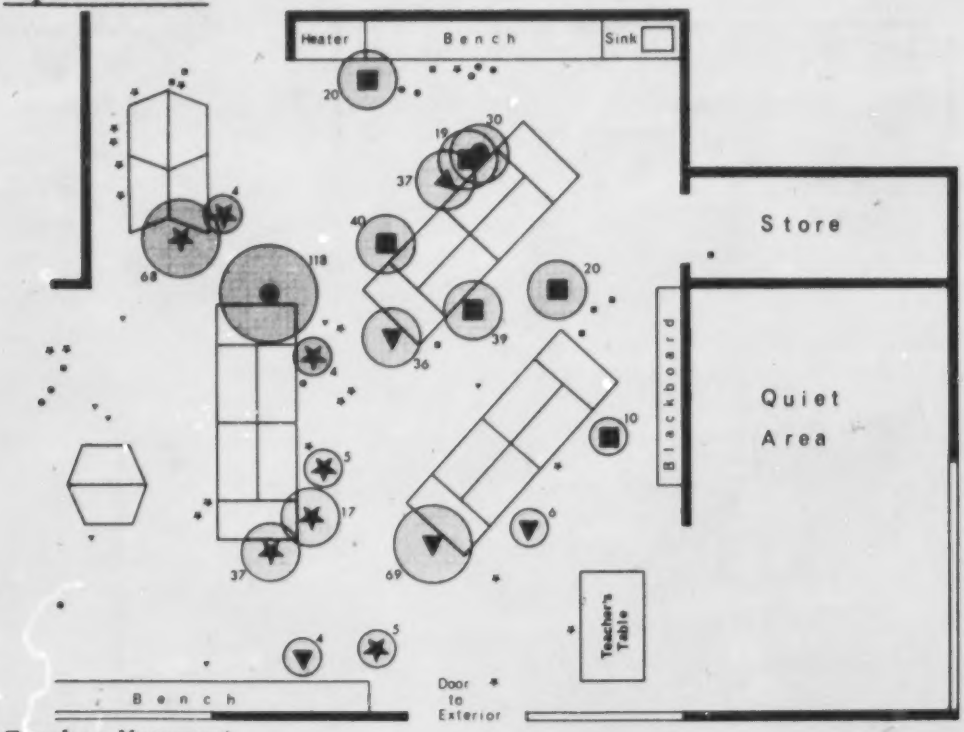


Teacher Movement

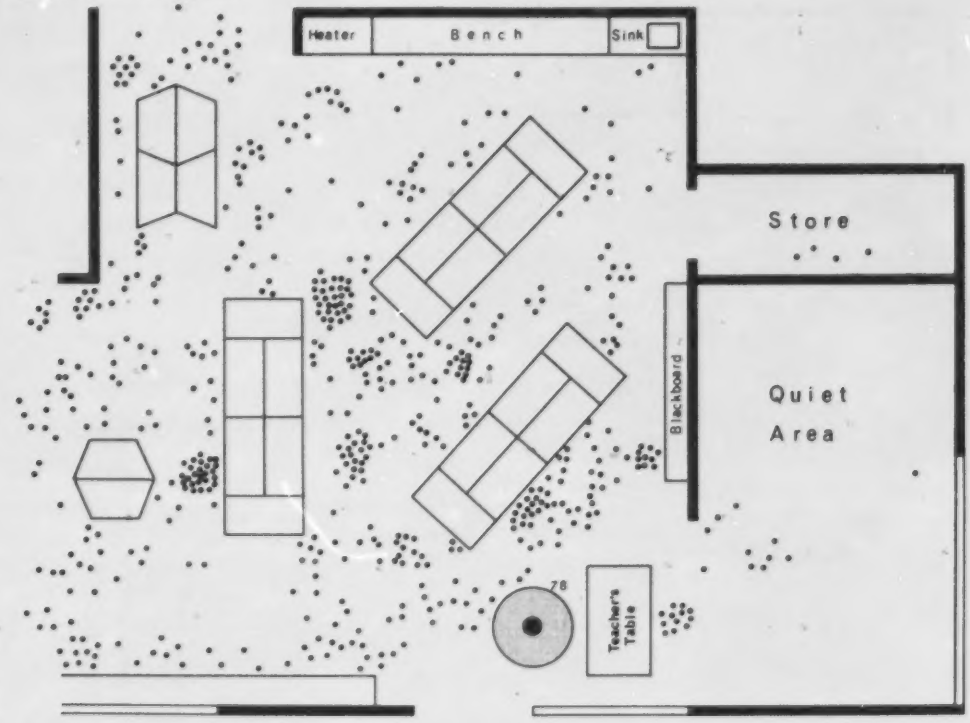


Classroom No. 4: Open Plan 1970 Model - upper right hand area

Pupil Movement

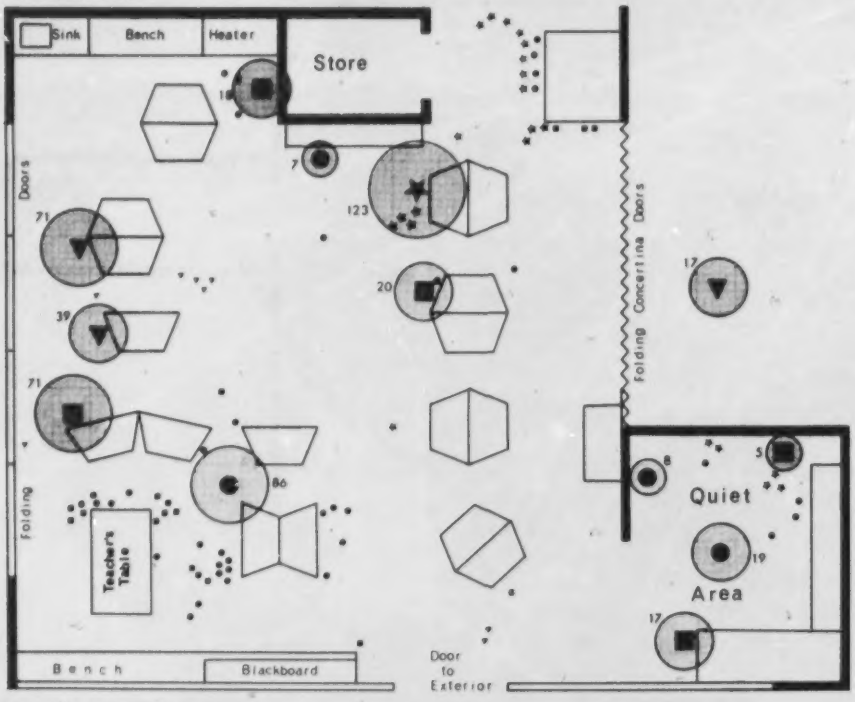


Teacher Movement

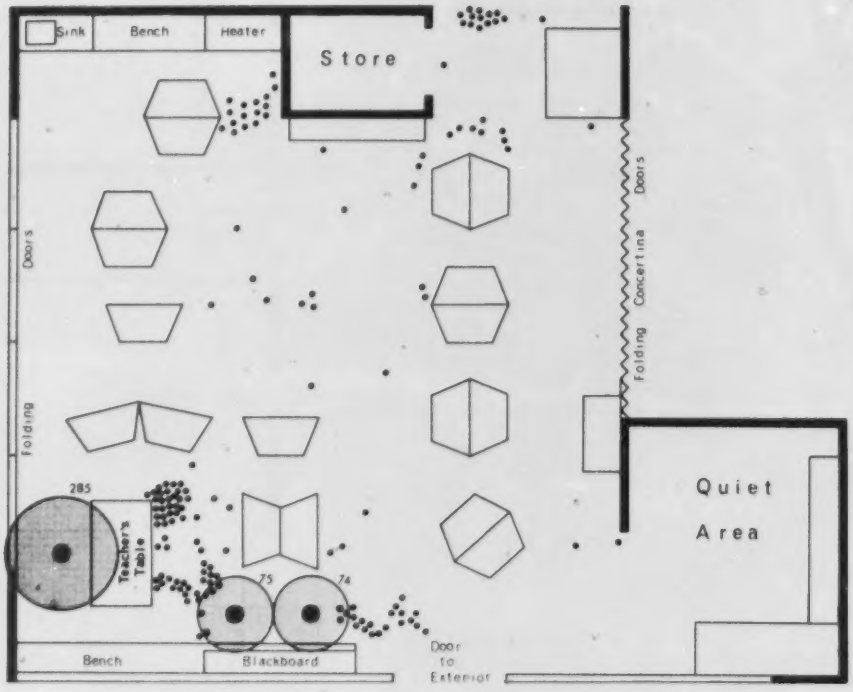


Classroom No. 5: Open Plan 1970 Model - lower centre right hand area

Pupil Movement

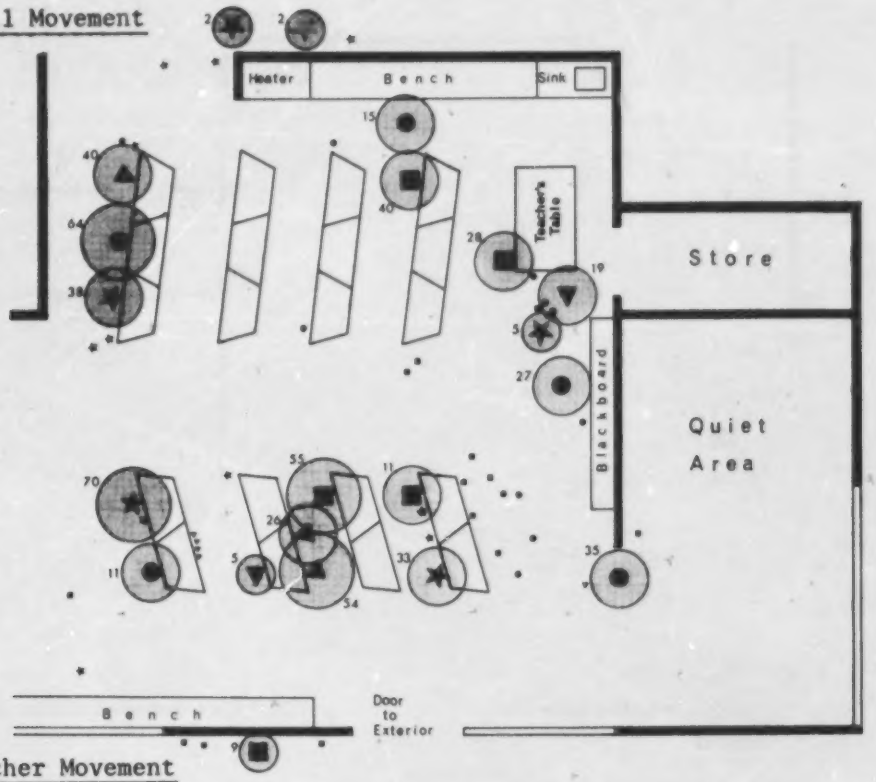


Teacher Movement

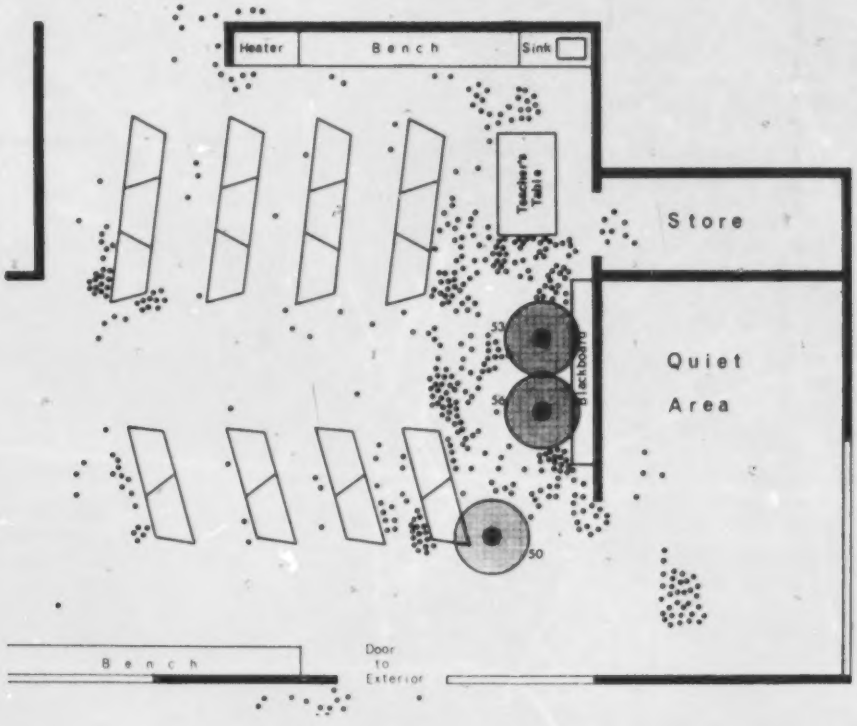


Classroom No. 6: Open Plan 1970 Model - upper right hand area

Pupil Movement

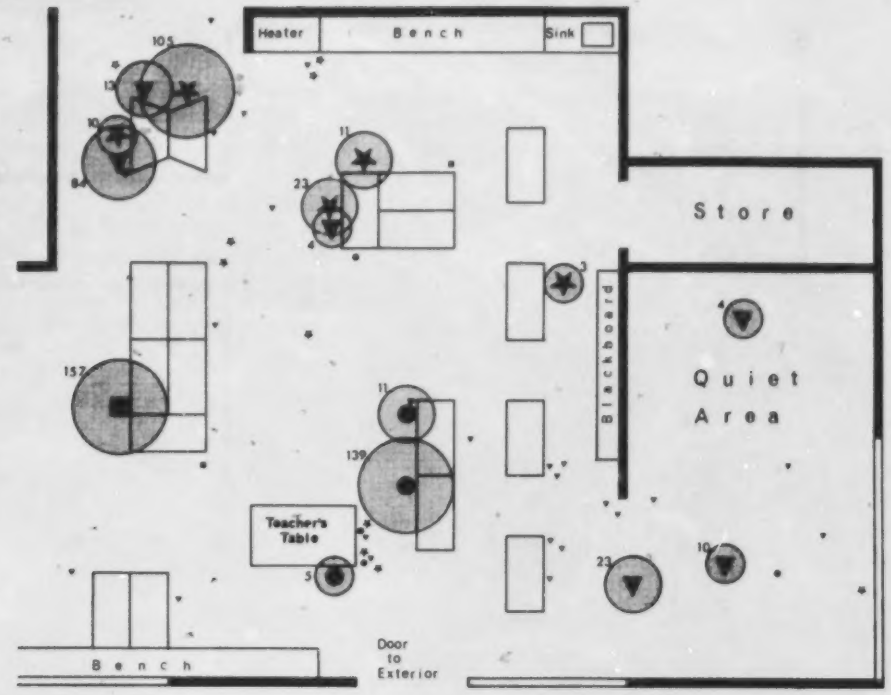


Teacher Movement

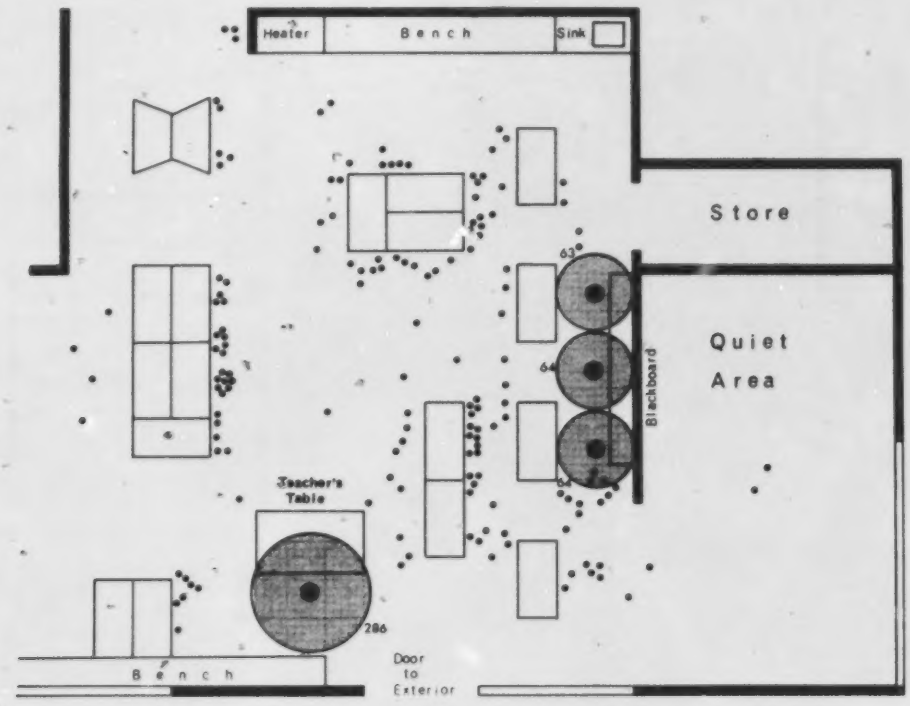


Classroom No. 7: Open Plan 1970 Model - upper right hand area

Pupil Movement

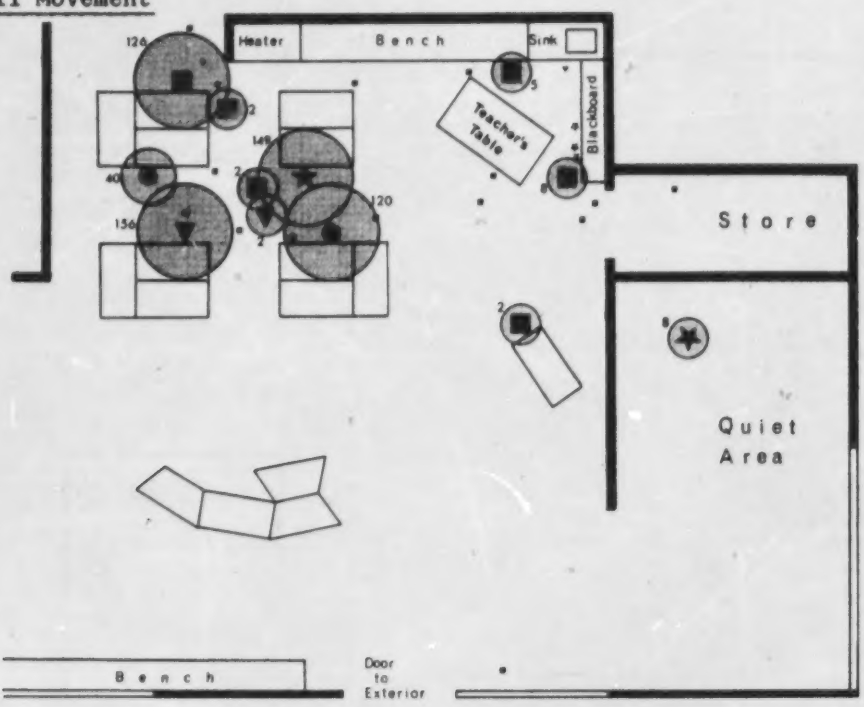


Teacher Movement

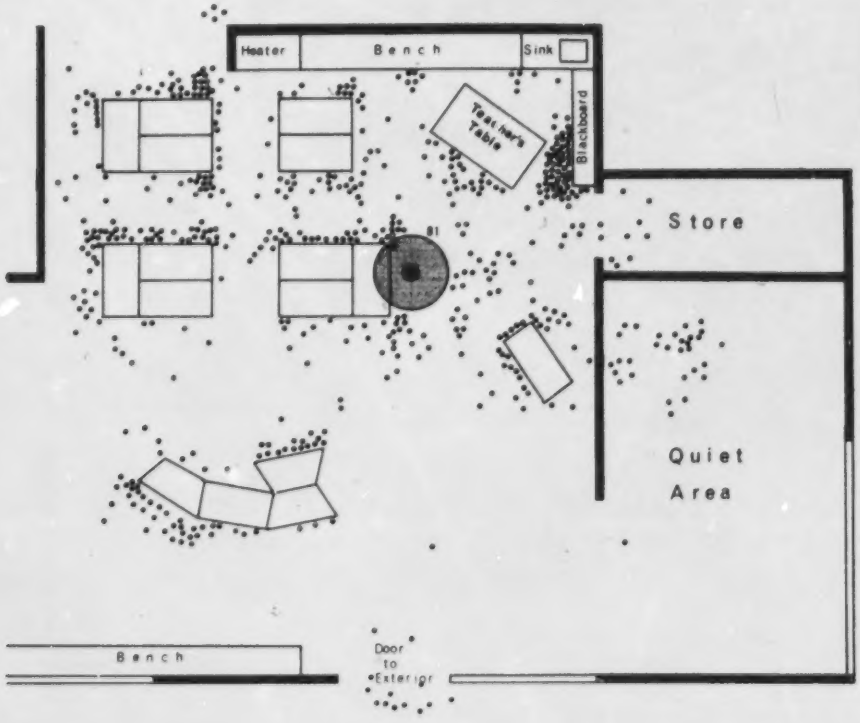


Classroom No. 8: Open Plan 1970 Model - upper right hand area

Pupil Movement

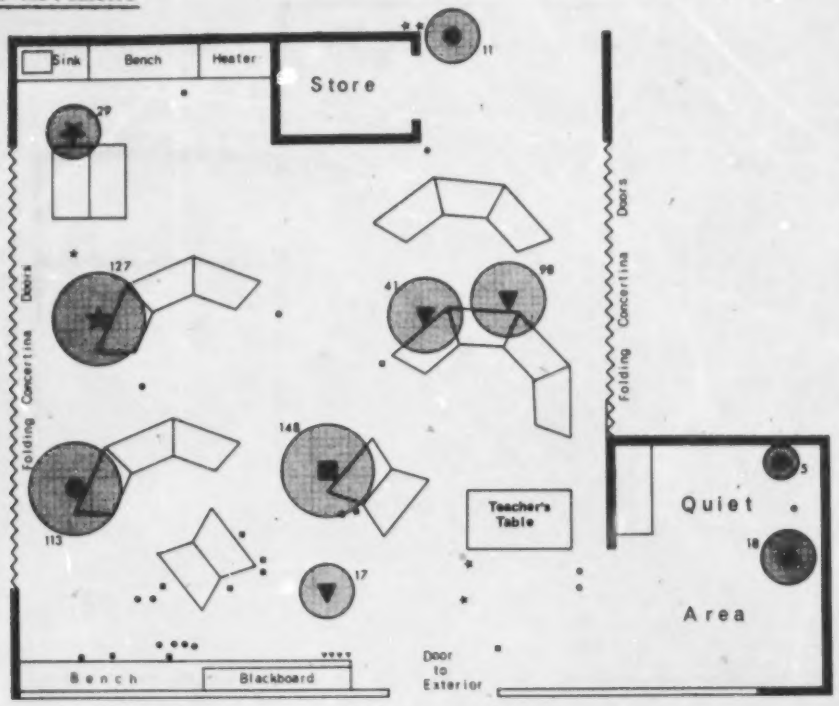


Teacher Movement

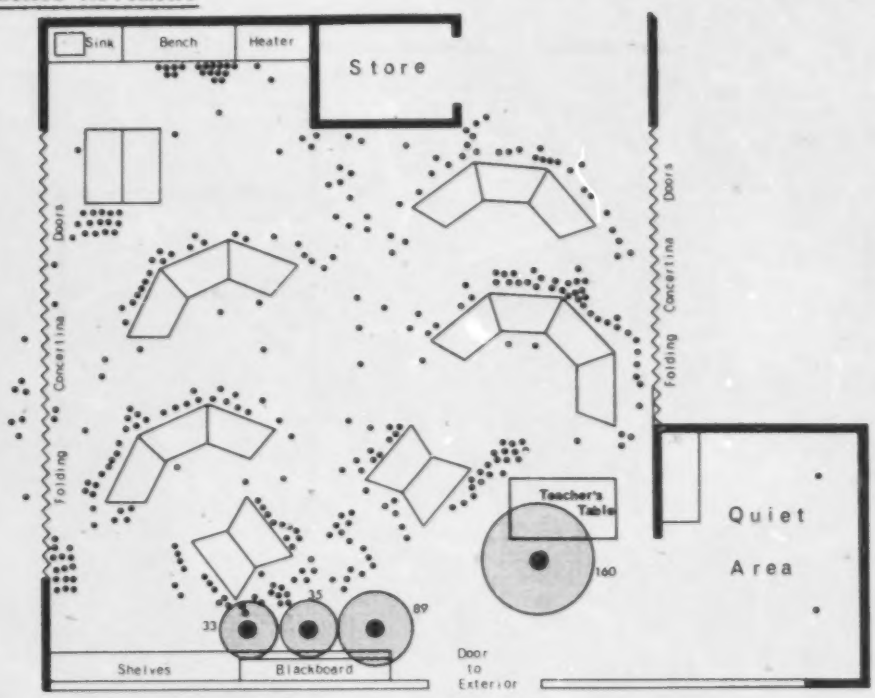


Classroom No. 9: Open Plan 1970 Model - lower centre right hand area

Pupil Movement

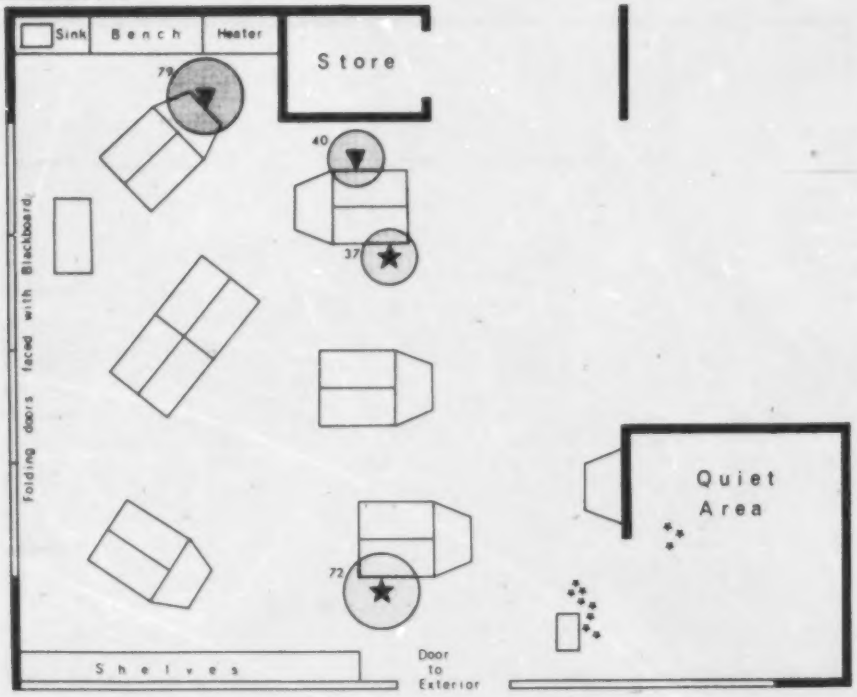


Teacher Movement

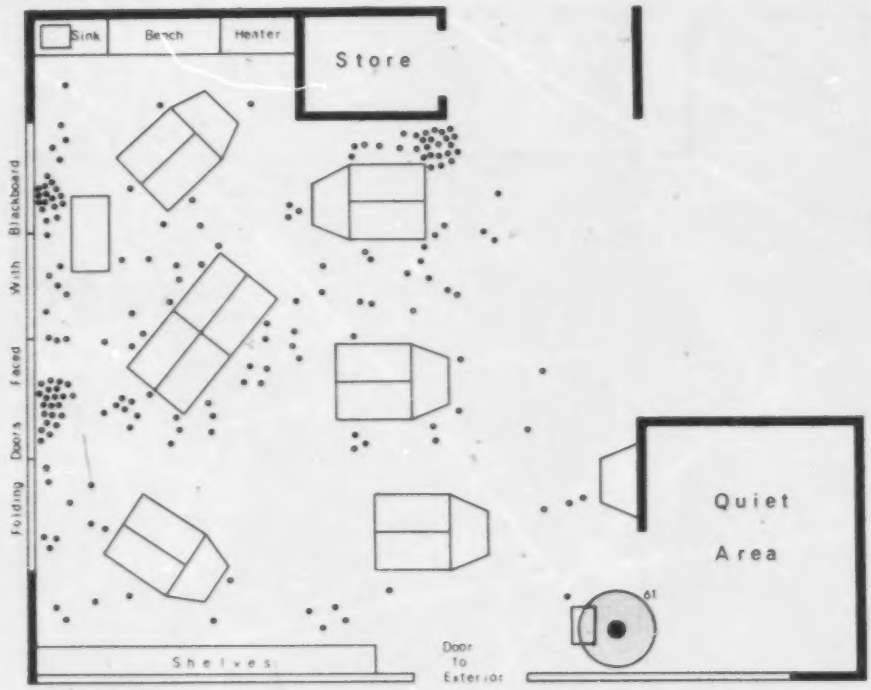


Classroom No. 10: Open Plan 1970 Model - lower centre right hand area

Pupil Movement

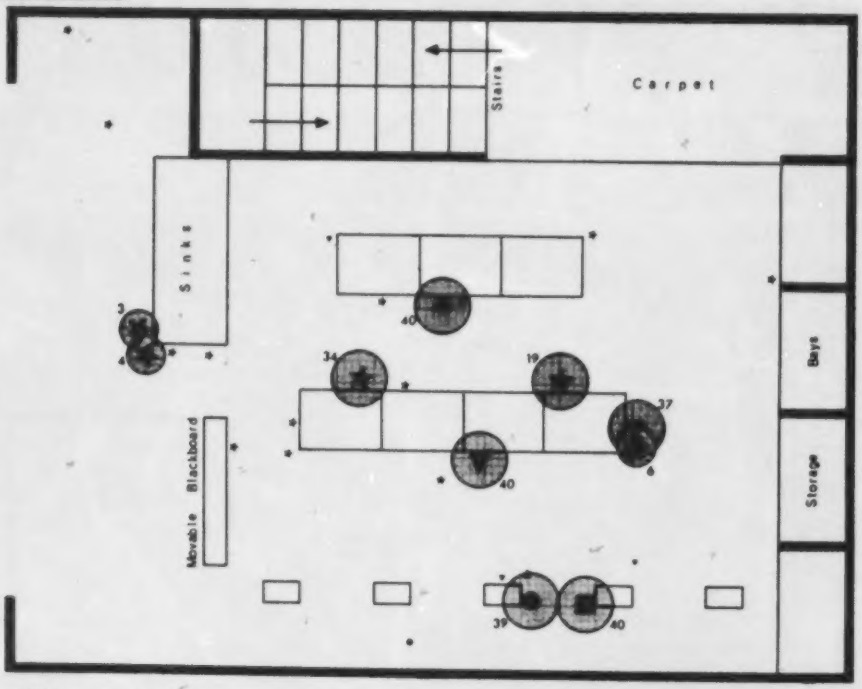


Teacher Movement

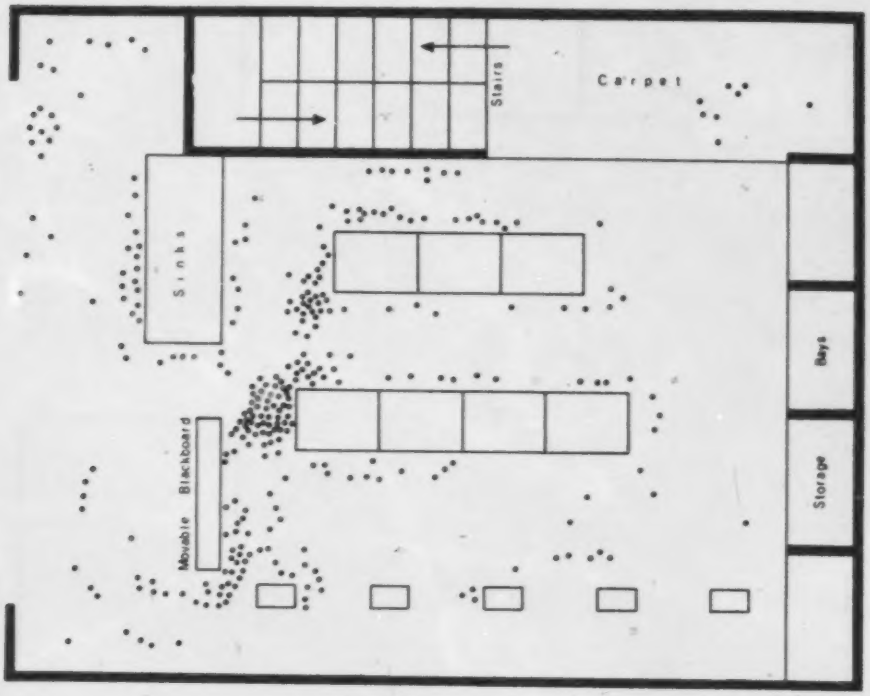


Classroom No. 11(a): Open Plan Non-Government School - Teacher (a) - area (1)

Pupil Movement

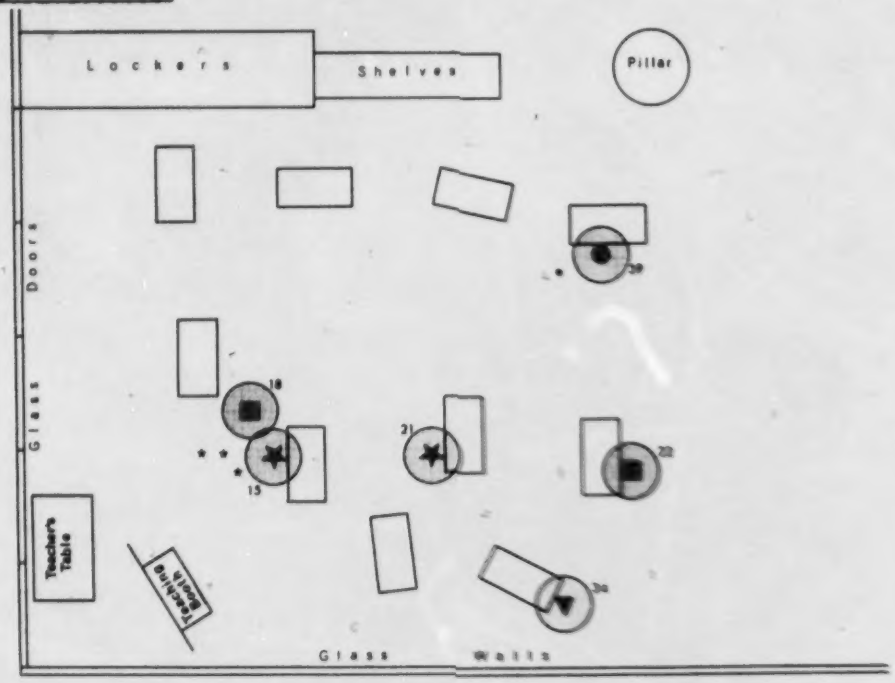


Teacher Movement

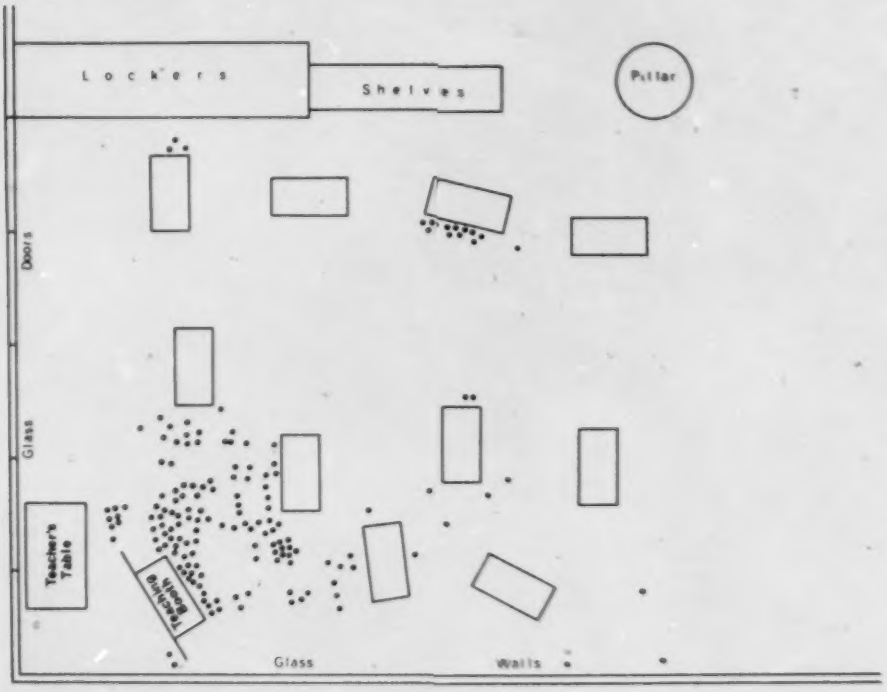


Classroom No. 11(a): Open Plan Non-Government School - Teacher (a) - area (2)

Pupil Movement

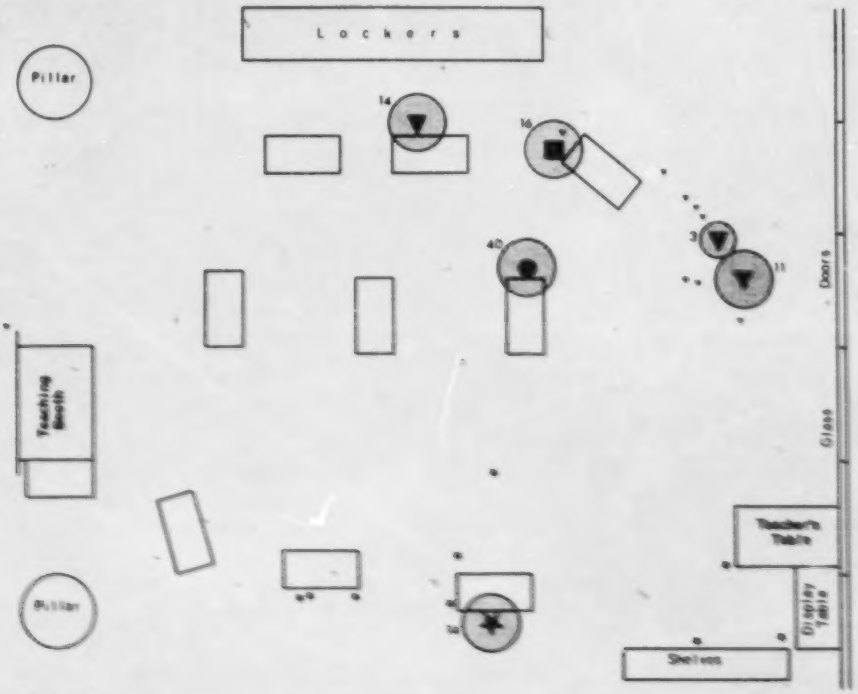


Teacher Movement

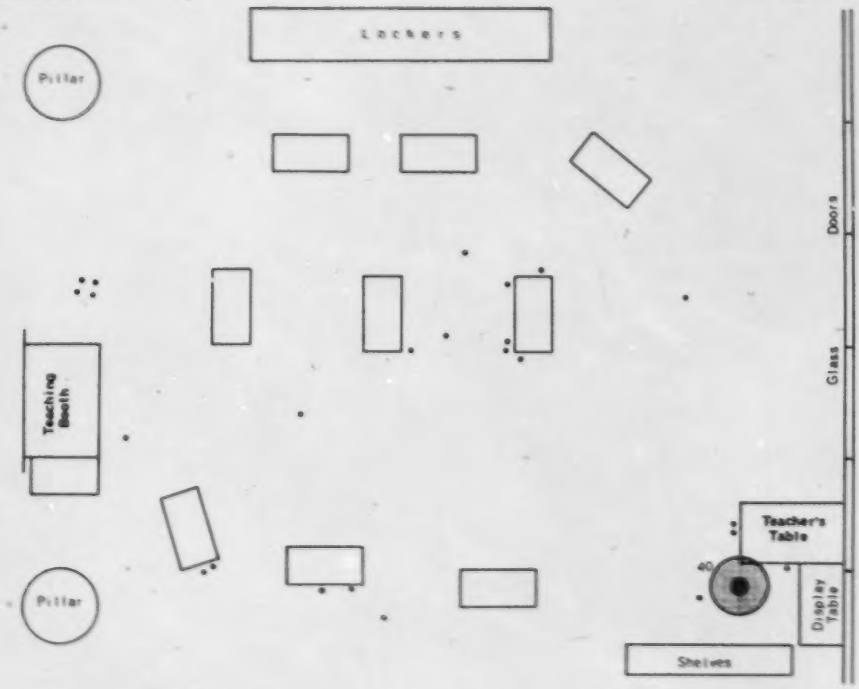


Classroom No. 11(a): Open Plan Non-Government School - Teacher (a) - area (3)

Pupil Movement

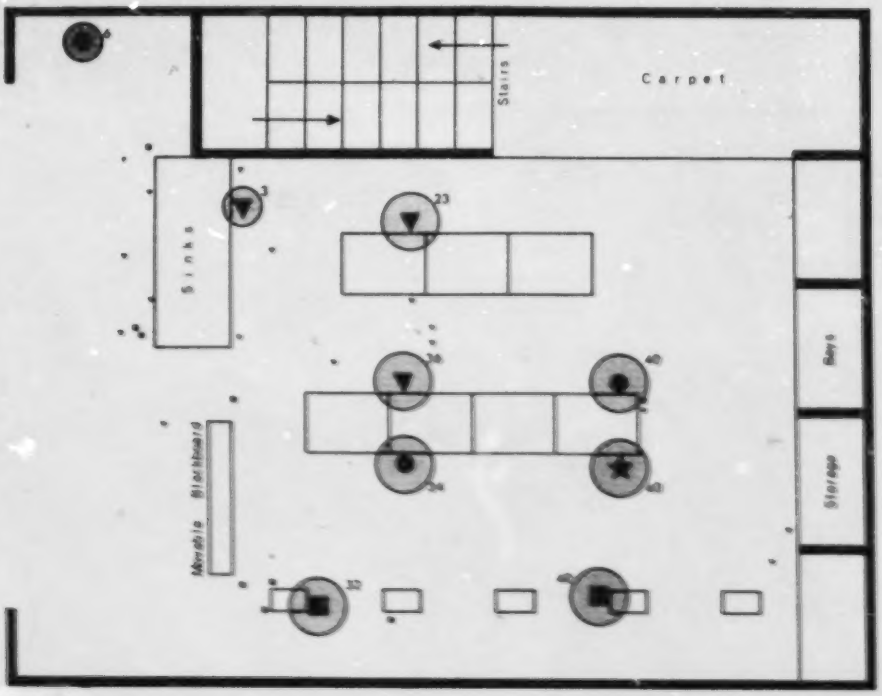


Teacher Movement

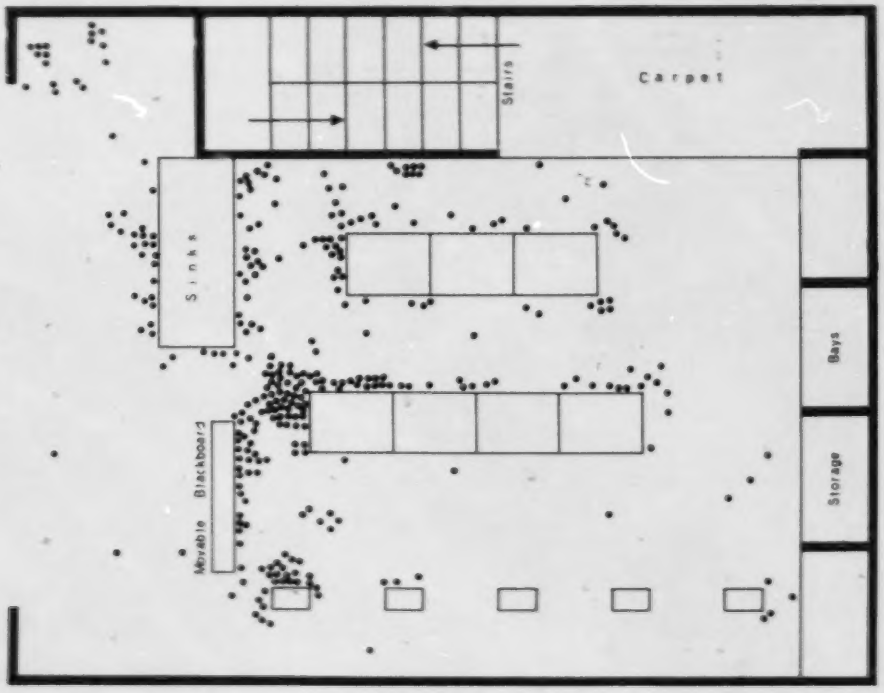


Classroom No. 11(b): Open Plan Non-Government School - Teacher (b) - area (1)

Pupil Movement

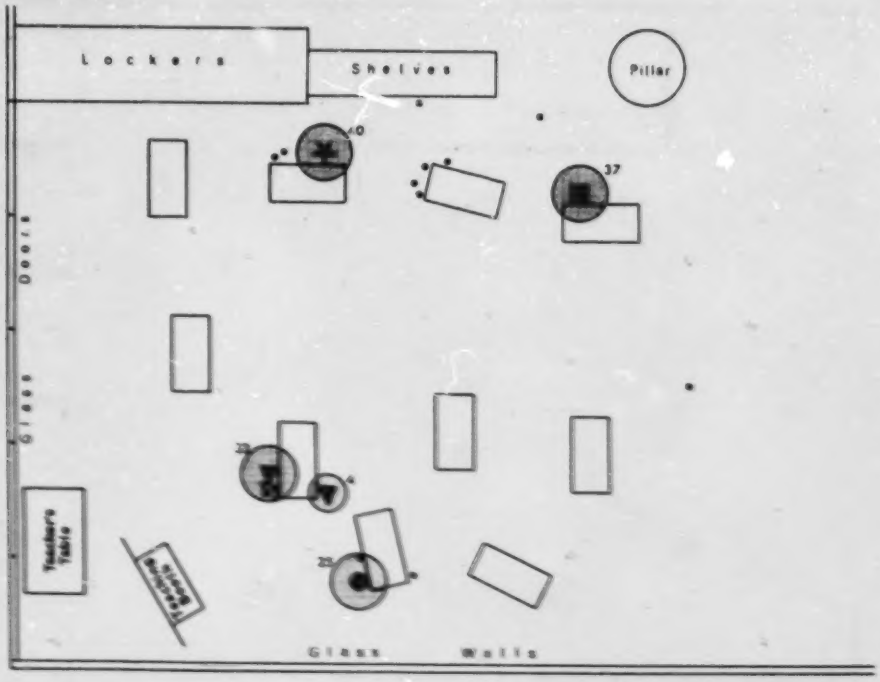


Teacher Movement

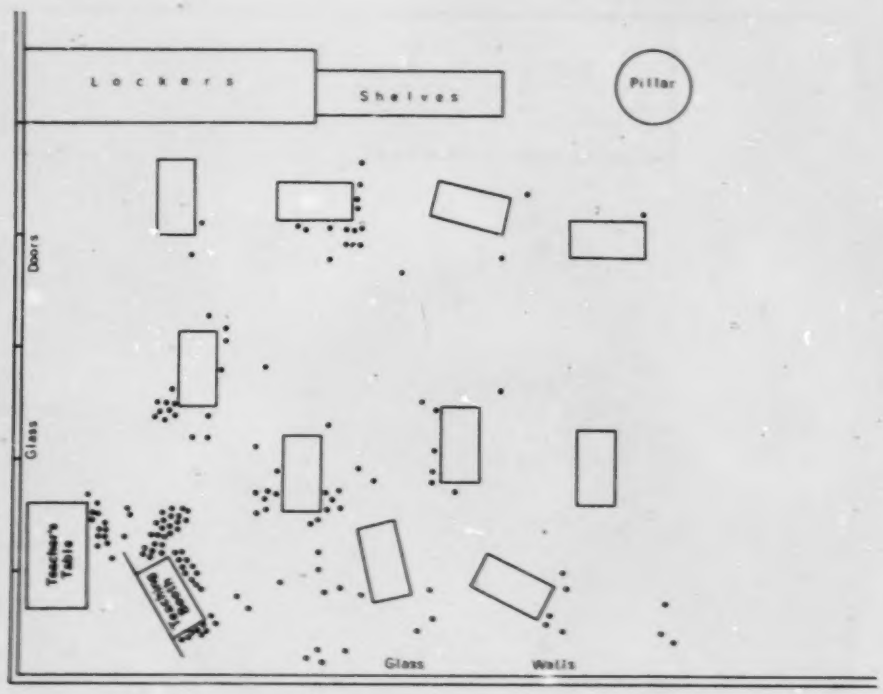


Classroom No. 11(b): Open Plan Non-Government School - Teacher (b) - area (2)

Pupil Movement

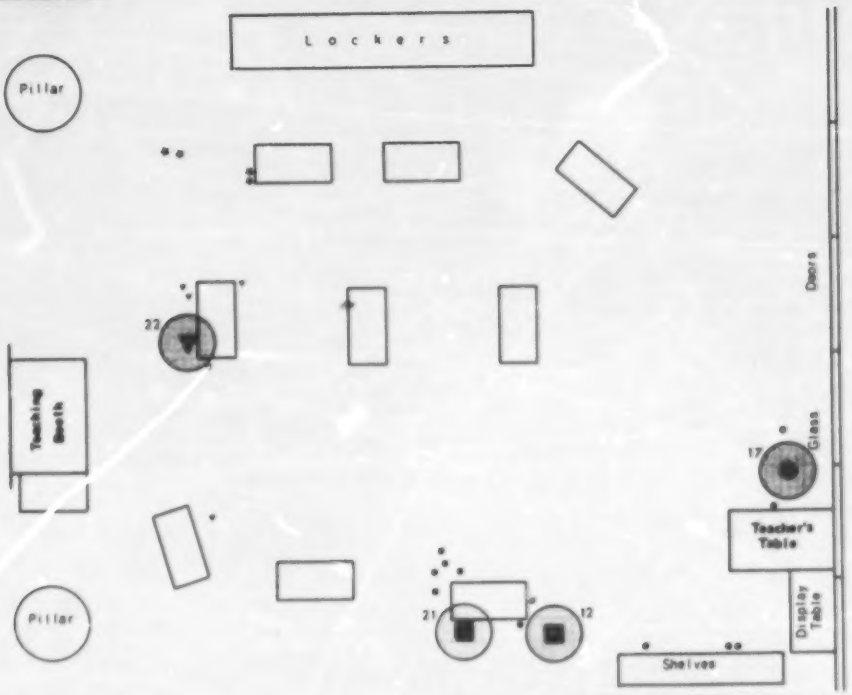


Teacher Movement

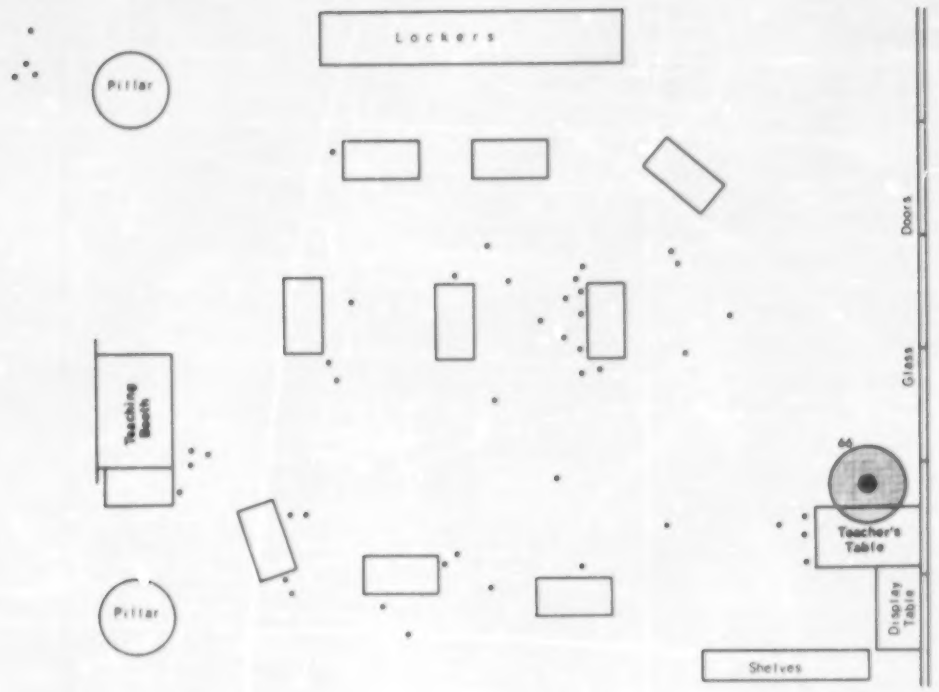


Classroom No. 11(b): Open Plan Non-Government School - Teacher (b) - area (3)

Pupil Movement

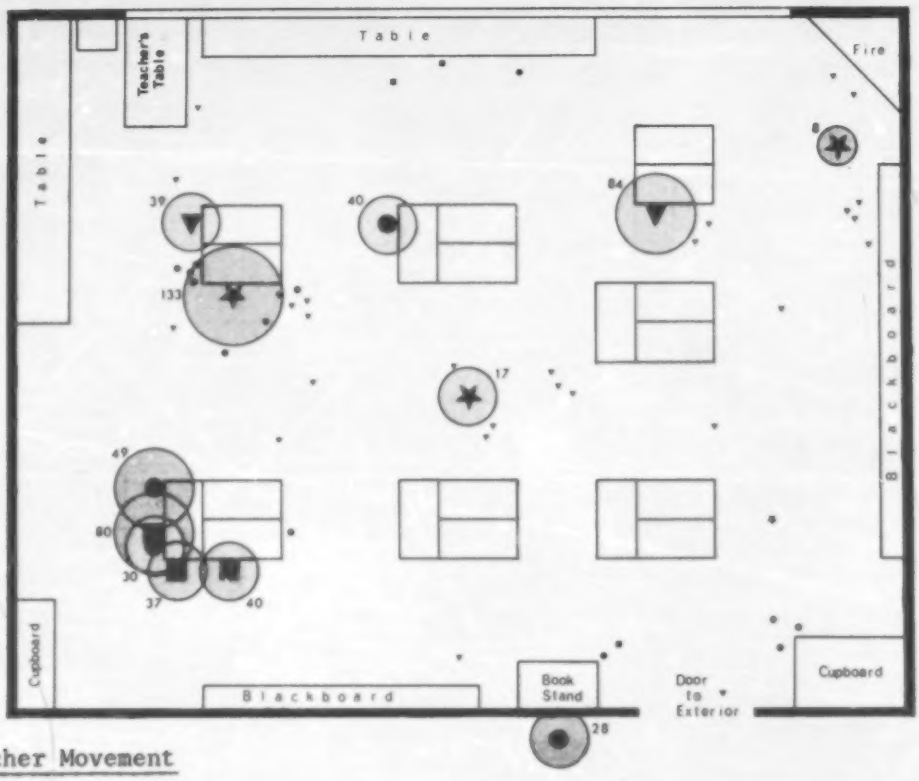


Teacher Movement

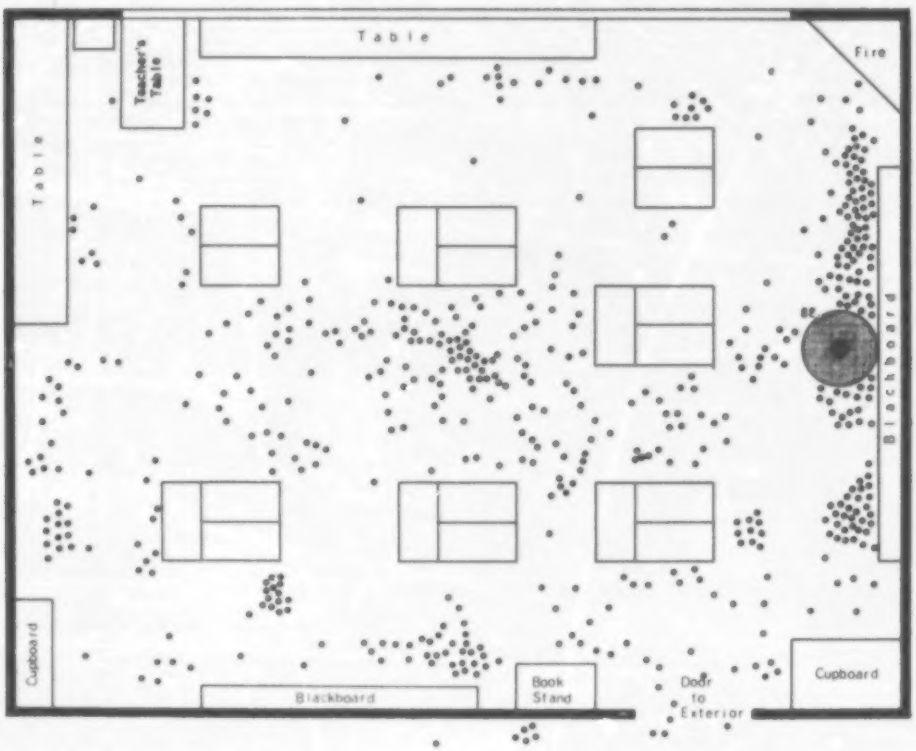


Classroom No. 12: Conventional School

Pupil Movement

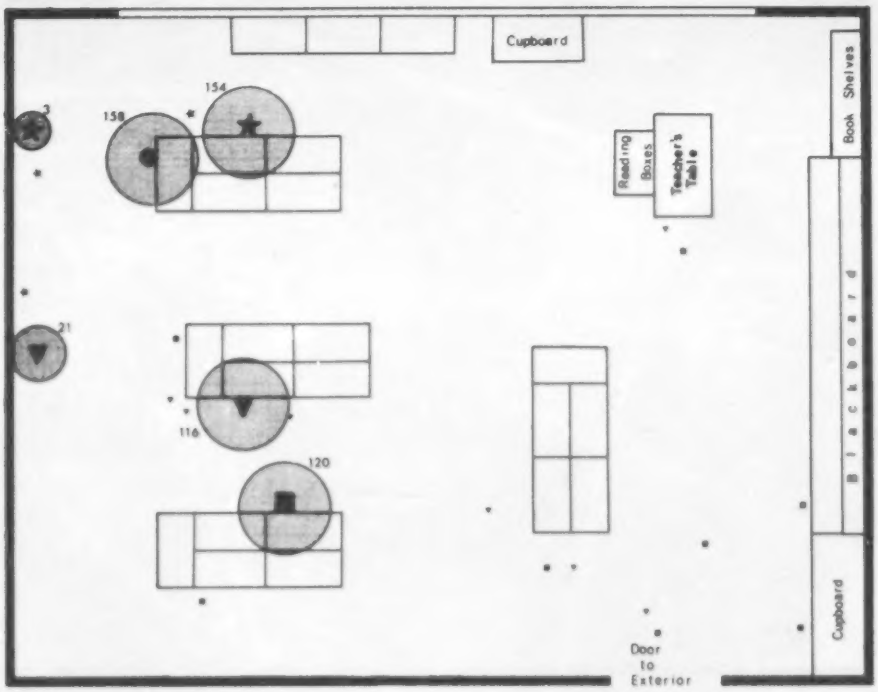


Teacher Movement

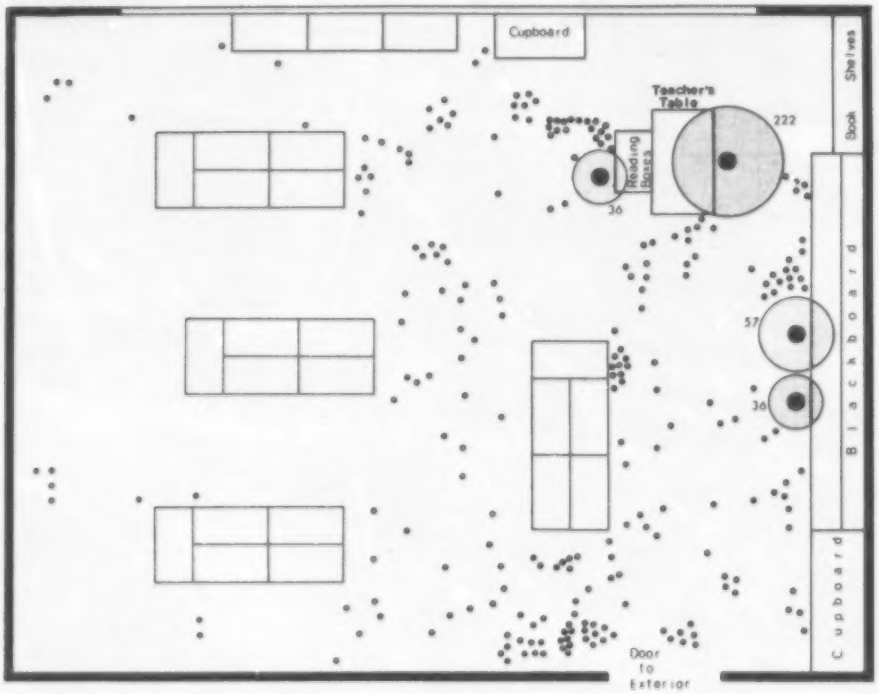


Classroom No. 13: Conventional School

Pupil Movement

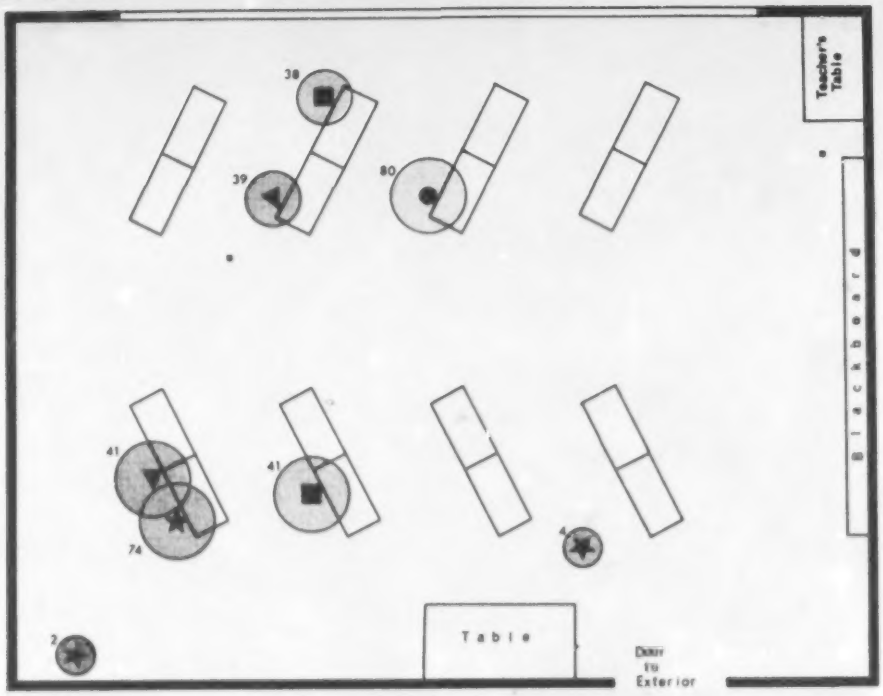


Teacher Movement

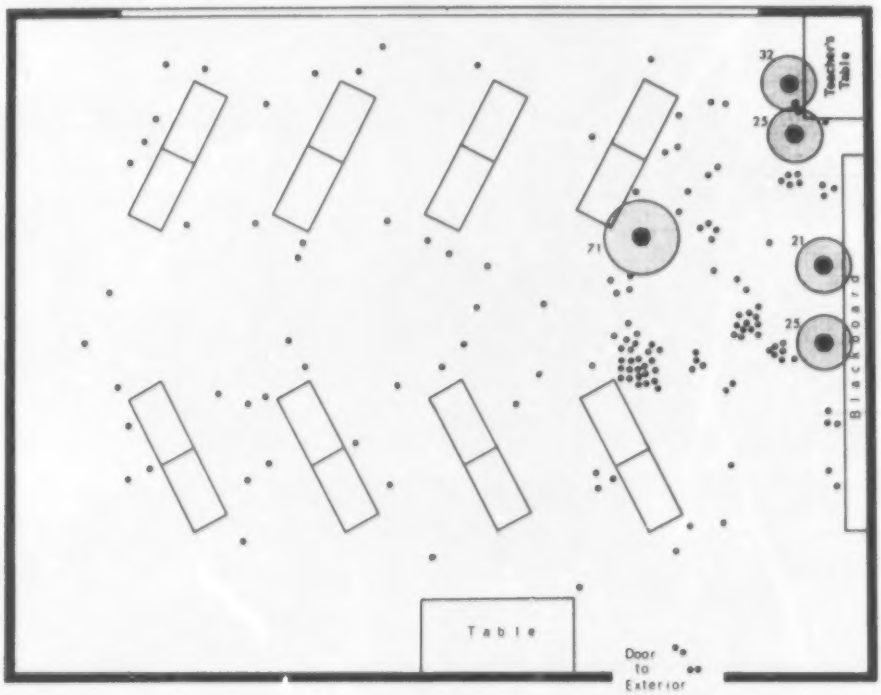


Classroom No. 14: Conventional School

Pupil Movement

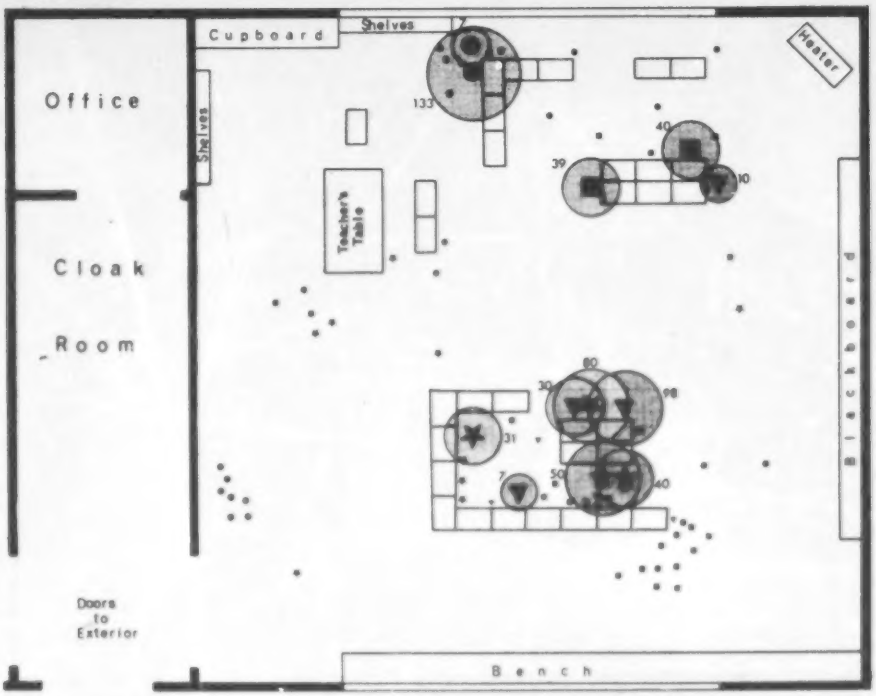


Teacher Movement

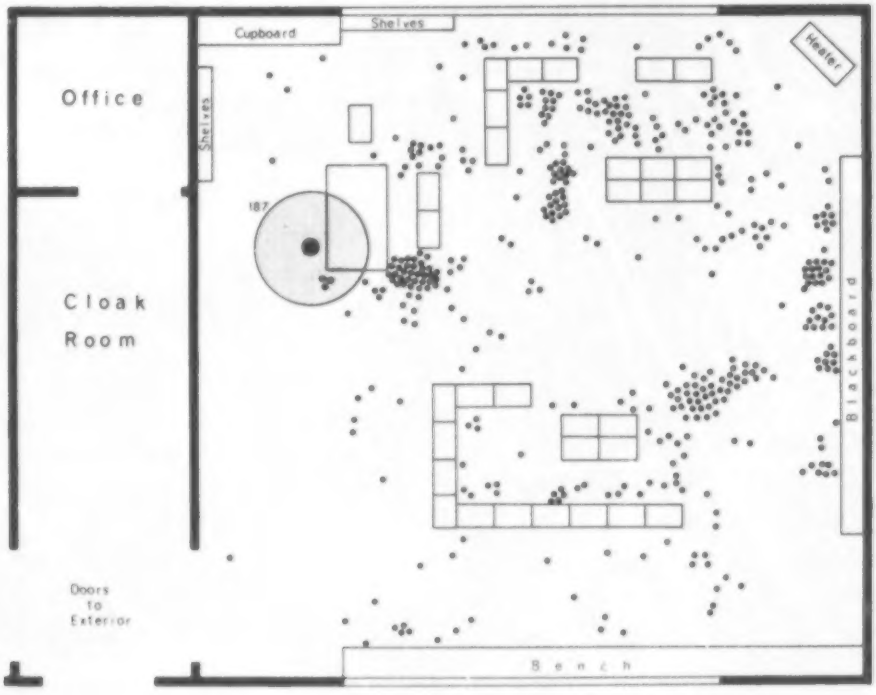


Classroom No. 15: Conventional School

Pupil Movement

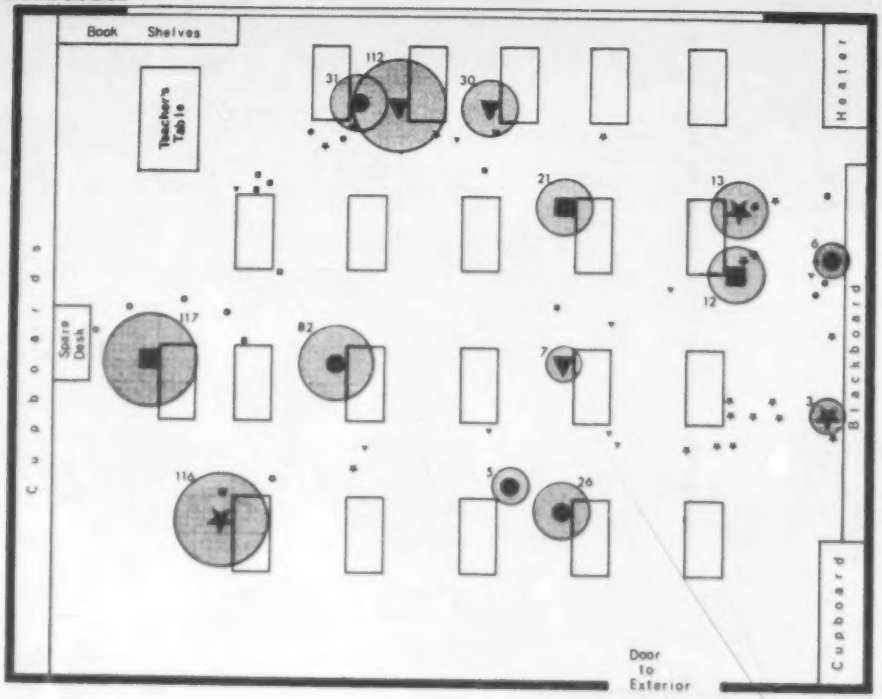


Teacher Movement

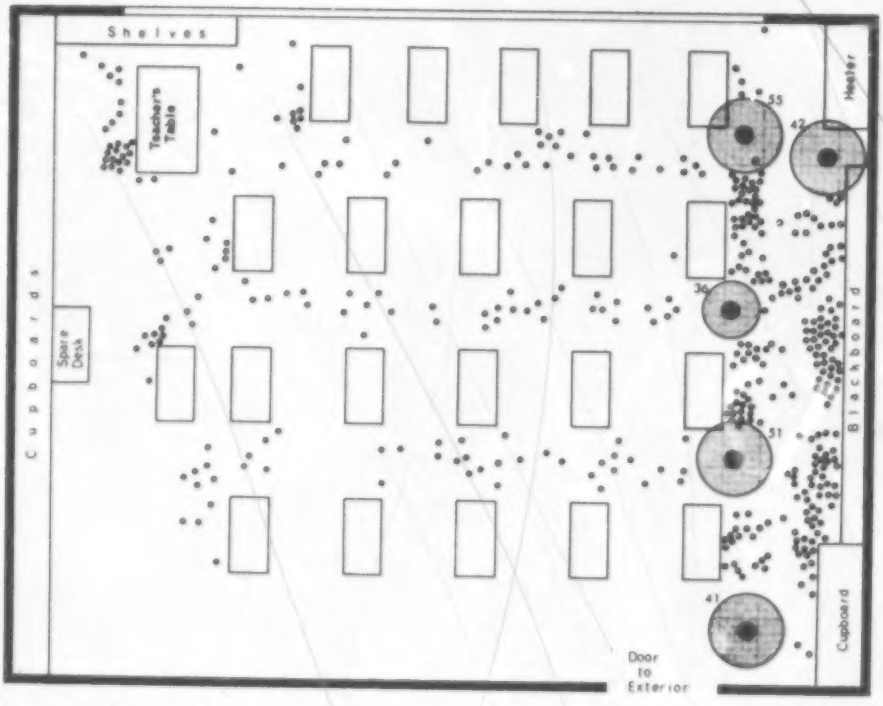


Classroom No. 16: Conventional School

Pupil Movement

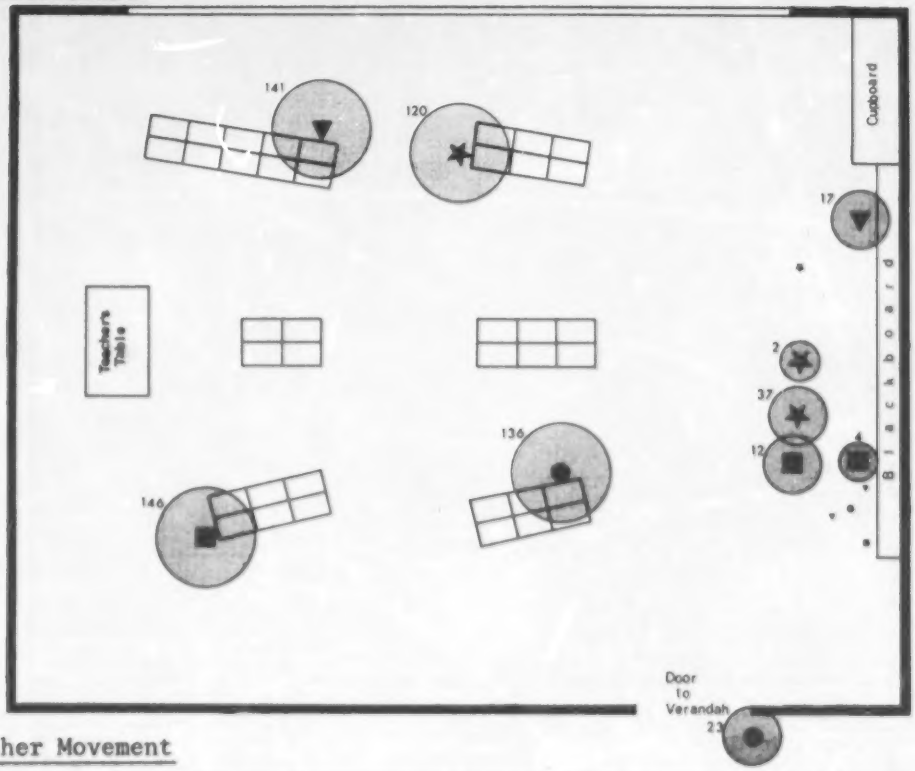


Teacher Movement

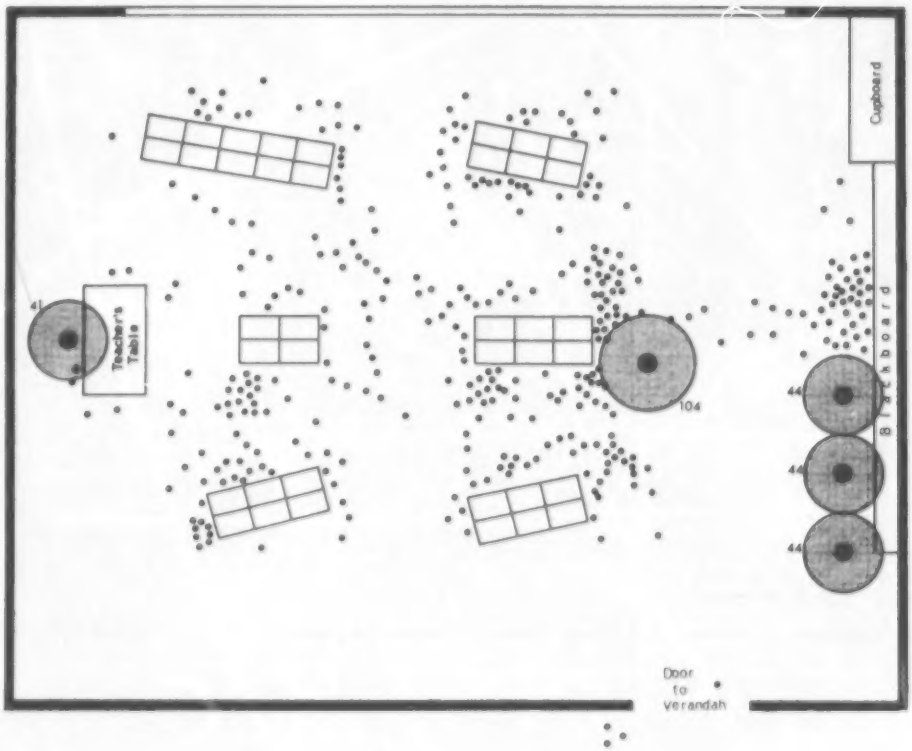


Classroom No. 17: Conventional School

Pupil Movement

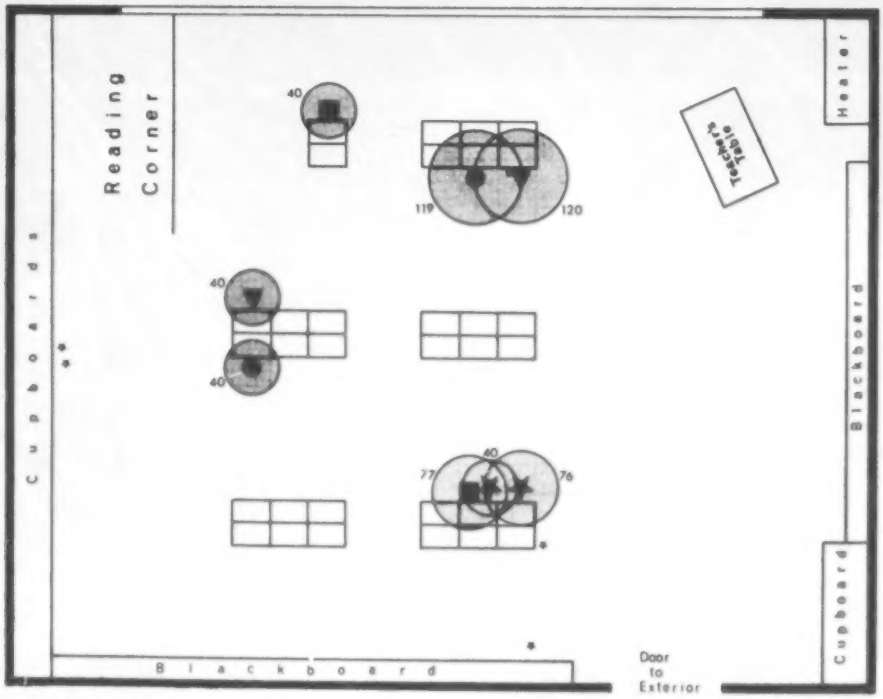


Teacher Movement

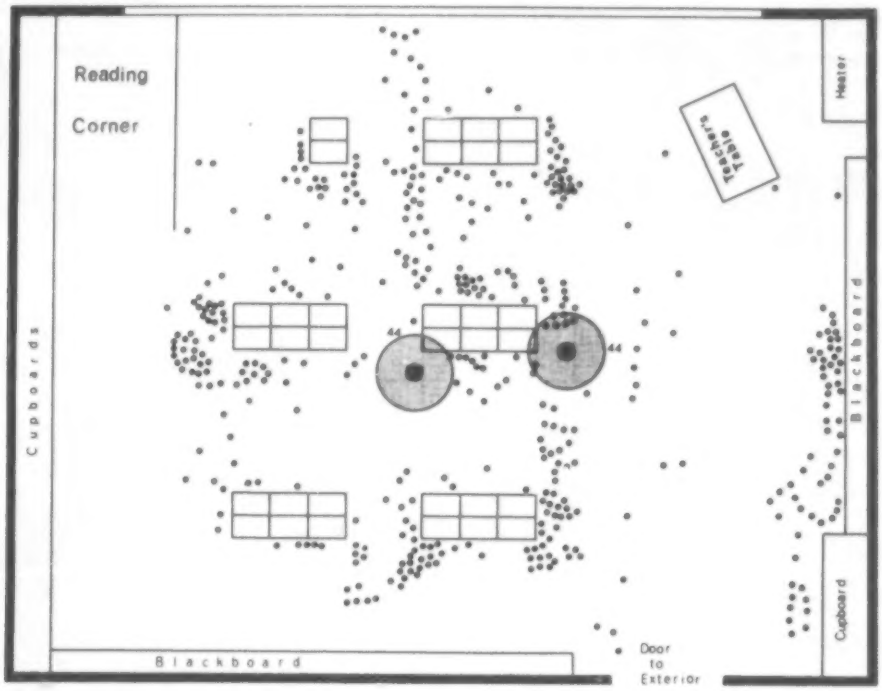


Classroom No. 18: Conventional School

Pupil Movement



Teacher Movement



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